

MARINE REVIEW

WEEKLY.]

AND MARINE RECORD.

[ESTABLISHED, 1878.]

Vol. XXVIII Eastern Office,
1023 Maritime Bldg., New York City.
Chicago Office, 373 Dearborn St.

CLEVELAND, O., OCT. 22, 1903.

Published every Thursday at 39-41 Wade Bldg.
by the Marine Review Pub. Co.
[Entered at Cleveland Post Office as second-class matter.]

Subscription \$3.00 year.
Foreign \$4.50 year.
Single Copy 10 cents.

No. 17

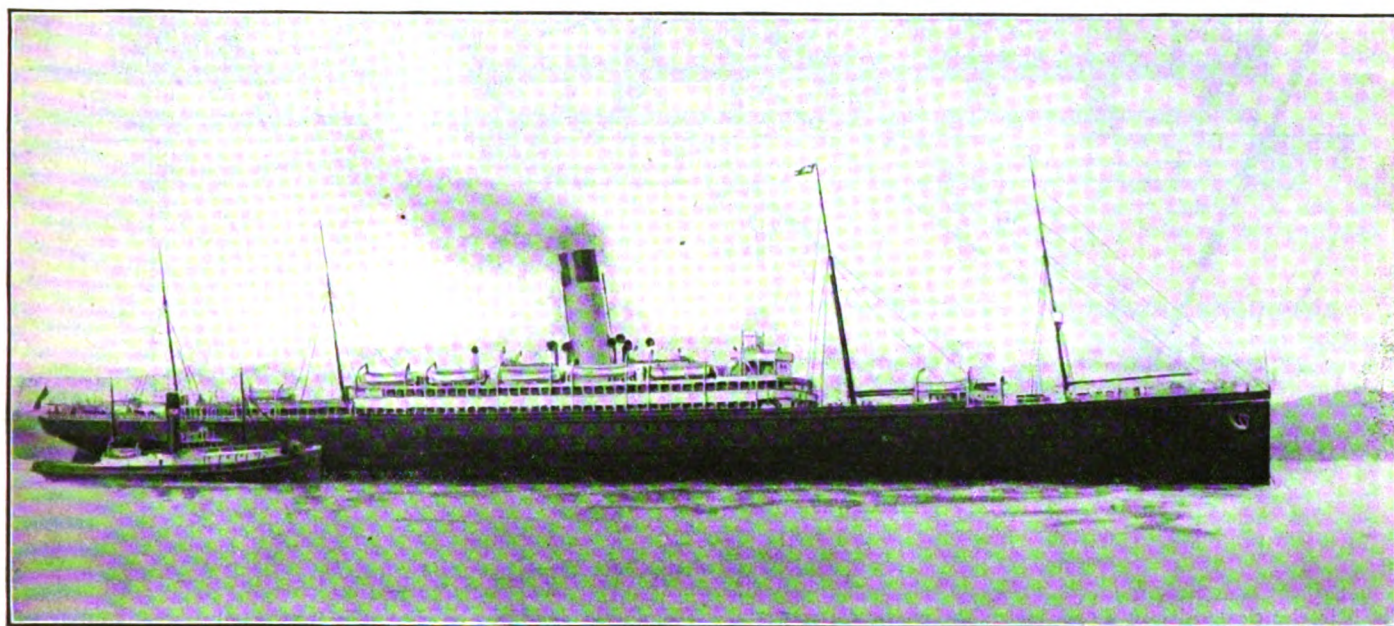
WHITE STAR LINER REPUBLIC.

The Republic, latest of the liners owned by the International Mercantile Marine Co., and operated by the White Star Line, has just reached this country on her maiden trip. She encountered heavy head winds and seas all the way over, but nevertheless made the voyage in 8 days, 8 hours and 33 minutes from Liverpool to Boston. She is intended for the Mediterranean service between Boston and Naples. She is a product of the yard of Harland & Wolff, Belfast, Ireland, a firm which has since 1872 built all of the White Star liners. The Republic is 587 ft. long, 67 ft. 6 in. beam and 44 ft. deep. Her gross tonnage is 15,378, making her the largest vessel trading to Boston. Her two quadruple-expansion engines are of 9,100 H. P. For these there are eight boilers and the coal consumption for a 16-knot speed is 144 tons per day. She was, when laid down, intended for the Do-

mond-class passengers, also a ladies' room, are arranged on the awning deck above the second saloon. The third-class passengers are splendidly catered for, there being a well-fitted-up mess room for them on the upper deck aft and a smoking room on the awning deck. Inclosed berths for this class of passengers are provided on the upper deck.

NAVY NOT ALARMED OVER CHATTANOOGA.

No alarm is felt at the navy department over the news that the Chattanooga is to be sold at sheriff's sale to satisfy the claim of creditors. The department has placed its case in the hands of the attorney general. In the case of the Galveston, when a similar course was attempted by certain creditors of the builders, the government executed "bonds in stipulation" by which such claims of creditors as might be sustained by the courts were pro-



The Steamship Republic, Latest Atlantic Liner of the International Mercantile Marine Co.

[Photograph published by permission White Star Line.]

minion Line, but before she went into commission the operation of the Dominion Line was taken over by the White Star Line. Her projection into the Mediterranean service is an evidence that there is going to be great rivalry for this trade. Elsewhere in this issue is published a picture of the Carpathia, the latest product of the Cunard Line, which has been placed in the Mediterranean service between New York and Naples. The Hamburg-American Line, too, has entered the field by transferring to it the Deutschland, which is the fastest steamship afloat, her Atlantic record not having yet been equaled by later vessels which were designed expressly to beat her.

The Republic is of similar design to the Commonwealth, now the Canopic. Her lines are fine and her general appearance commanding. She is fitted with four pole masts and one funnel of proportionate dimensions. The hull is exceptionally strong and is of the cellular double-bottom type.

The main dining saloon is contained in a steel house erected on the awning deck. It is beautifully wainscoted and decorated and handsomely furnished. It is surmounted with an elaborate stained dome skylight. Seating is provided for 200 passengers. The saloon is approached by a handsome and spacious stairway leading down from a companionway above, and from each side of the awning deck. On the deck above is a house containing the companionway entrance, together with a ladies' room and library. These are tastefully decorated and furnished, polished hardwoods being used in the finishing of the various apartments. Most of the staterooms are in the same house as the main saloon, all the baths, lavatories, etc., being in the after end of the same erection. Second-class passengers are accommodated on the deck below and are excellently provided for, the fine dining room being fitted to seat over 100 passengers. On this deck there are also a large number of first and second-class staterooms. Other apartments are likewise fitted on the same deck, including galleys and pantries. On the middle deck more first-class staterooms are provided forward, while a number of second-class rooms are situated aft. These are arranged conveniently for the respective saloons and accommodations. A comfortable smokers room for sec-

ted, and then proceeded to complete the vessel in a government yard. In this instance the same character of bond was offered, but the commissioner for the supreme court of New Jersey refused to accept it and release the vessel, and, as it then became a conflict between the government and the state courts of New Jersey, the entire matter was placed in the hands of the attorney general. No anxiety is felt by the department of justice, which is confident of its ability to protect the rights of the government, although the method to be pursued is not made public. Attention is called to the fact, however, that the government has never made full payment for the work in progress on the vessel, a reservation being made on every payment in order to protect the government's interests. Moreover, the navy department holds ample bonds, not only to protect it against any possible loss from legal proceedings, but also against loss by delay, so that there appears to be no possibility of the navy department's suffering from legal procedure. It is possible, however, that, as the Chattanooga is almost completed, the government may itself bid in the vessel and complete it at the New York navy yard.

INDORSE PLANS FOR 13,000-TON BATTLESHIP.

Rear Admirals O'Neil, Bowles and Rea, composing a majority of the naval board of construction, have made a report to the secretary of the navy adhering to the plans first submitted to the two first named for the 13,000-ton battleships Idaho and Mississippi. Rear Admiral Bradford has filed a minority report. After the board's first disagreement, Secretary Moody submitted the questions involved to nine expert naval officers. Six of these, including Rear Admiral Higginson and Capts. Converse and Manney, sided with Admiral Bradford in his insistence upon ships of 18 knots speed, while Rear Admiral Taylor and two others favored the plan of Admirals O'Neil and Bowles for ships of 16½ or 17 knots speed. Secretary Moody sent these opinions to the construction board and urged its members to get together. Capt. Converse, one of the experts whose opinion was asked by Secretary Moody, succeeds Admiral Bradford this week.

DREDGE OPERATED BY ELECTRICITY FROM SHORE.

A type of ladder dredge constructed by A. F. Smulders, engineer and ship builder of Rotterdam, from designs by Mr. Bunau-Varilla, may be of great interest to Americans from the fact that the dredge is electrically driven by power generated on shore. The dredge has been utilized for dredging ballast on the River Esla, near Benevente, in the province of Zamora, where Mr. Varilla was projecting the new line between Plasencia and Astorga.

The principal peculiarity of the dredge resides in the fact

that the free movement of other vessels up and down the stream is unimpeded, even whilst the dredger is at work.

The method of procedure is as follows: The proper position for beginning work having been attained a heavy pile is sunk about which the vessel can swing. This swinging is effected by the electrically-driven screws shown at the stern of the boat in Fig. 2. Trials made in the Meuse on Feb. 4, 1896, showed that the dredger could be kept up to its work, broadside to the full tidal current, with only one of the two screws in action. The buckets came up full, the work being carried out without the

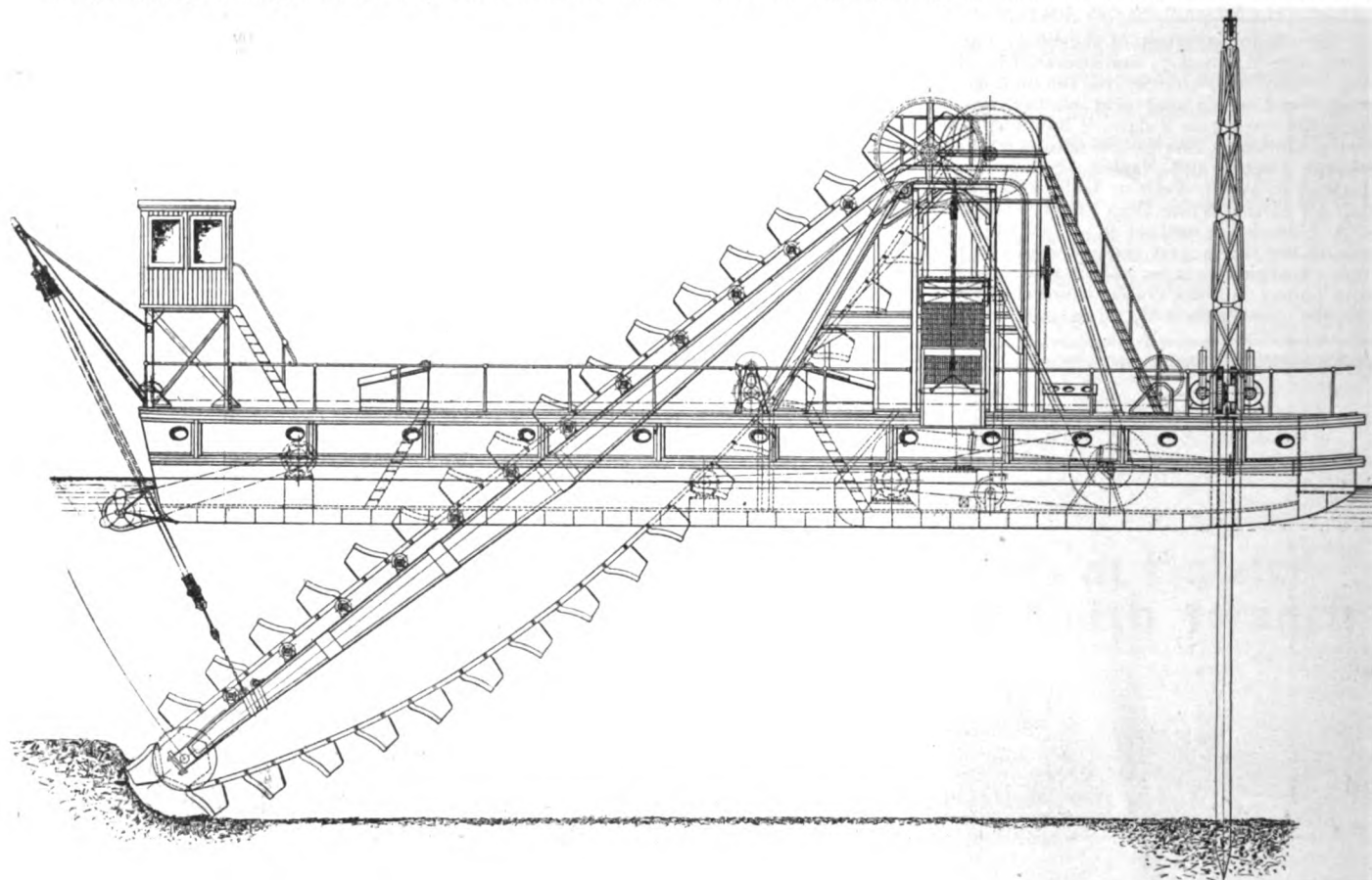


Fig. 1. Electrically Driven Ladder Dredge.

that it is electrically driven throughout. The current is generated at a high pressure at some suitable point on the river bank and conveyed to the dredger by means of overhead wires or suitably protected subaqueous cables. The same generating station also supplies the power needed for working the conveyor, by means of which the ballast received from the dredger bucket is transported and tipped into the ballast wagons. The general con-

struction of the machine is well shown in Fig. 1, whilst the details of construction will be understood on referring to Fig. 2.

struction of the machine is well shown in Fig. 1, whilst the details of construction will be understood on referring to Fig. 2. The method of advancing the dredger to a new position is equally novel. A second pile hole is placed near the bow of the boat at a distance of 2 metres from that previously referred to. In shifting to a new position, the dredger is swung at an angle to its desired course and another pile is then driven down through

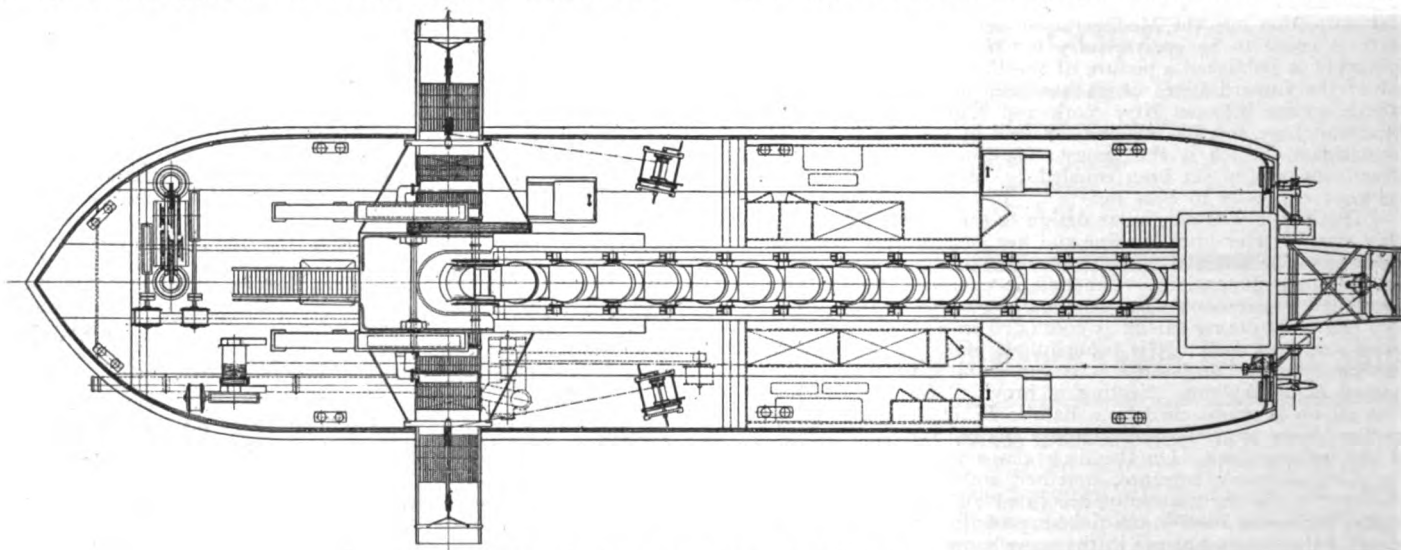


Fig. 2. Electrically Driven Ladder Dredge.

struction of the machine is well shown in Fig. 1, whilst the details of construction will be understood on referring to Fig. 2.

An entirely novel system of anchoring the dredger and of traversing it and moving it forward has been adopted, since no anchorage or mooring chains are used, the sole connection between the river banks and the dredger being the electric cable, so through an opening purposely left in the bow of the boat (see Fig. 1) and driven into the river bottom, thus forming a fixed point

this second hole. The first pile is then lifted and the dredger is swung back till the central pile hole is over a point in the channel some feet in advance of its previous position. The central pile is again lowered and the side pile withdrawn, after which the work of excavation goes on as before.

The piles are made of steel tubing and are heavy enough to enter an ordinary river bed by their own weight, whilst in the case of very hard ground they may be filled with lead. The lift-

ing and lowering of the piles is, like all the other operations of the dredger, controlled by a single attendant, all the necessary switches being grouped in the cabin shown at the stern of the boat. The chain of buckets is driven by a three-phase motor of 45 H. P., which, however, is capable at a pinch of developing as much as 70 H. P. It is, like the motor working the pile gear and the ladder crane, designed to run at 600 revolutions per minute, the necessary reduction in speed being effected by gearing. The operations of starting and stopping can be effected with great rapidity and the speed when running is perfectly constant.

The torque exerted varies greatly as the buckets pass over the tumbler. Running empty the current taken as the bucket rises over the latter corresponds to 20 H. P., whilst when the summit is passed the current falls to zero. With a full bucket the ordinary maximum effort corresponds to about 30 H. P., so that the average demand may be taken as 15 H. P. only, thus leaving a very large reserve of power. Should, however, the resistance met with exceed the maximum power available, the fuse on the motor circuit blows, thus saving the apparatus from damage. The replacement of this fuse is, of course, only a matter of a few minutes.

The generators selected by Mr. Varilla deliver to the mains a triphase alternating current at 2,000 volts. This is transformed on reaching the dredger to a 200-volt current, with which the different motors are designed to work. These are seven in number, two being employed for driving the screws, one for lifting the ladder, one for driving the chain, two for the pile gear, and one for a centrifugal pump, the discharge from which is used for washing the ballast free from sand.

PHILADELPHIA SHIPPING NEWS.

Philadelphia, Oct. 21.—The annual meeting of the New York Ship Building Co. was held last week in Camden and the following officers were re-elected: President, De Courcy May; vice-president and general manager, Charles S. Hall; secretary and treasurer, Samuel L. Knox; superintending captain, William G. Randle; directors, De Courcy May, Charles S. Hall, William G. Randle, Henry Walters, Myron C. Wick, Michael Jenkins, A. W. Mellen. The report of President May reviewed the work of the year and stated that the company's business is in a healthy condition. A large number of contracts are on hand, the report stated, sufficient to insure employment to a full force of workmen for some time. The report was received with satisfaction by the directors. At present writing it is likely that the 625-ft. steamship *Manchuria*, being constructed for the Pacific Mail Steamship Co., will be launched Oct. 31. Capt. William G. Randle left the yards Monday morning in charge of the fire tug *Abram S. Hewitt*, which he will take to New York and turn over to the fire department of that city.

The cruiser *Denver* left the Neafe & Levy ship yard last Thursday to proceed to Boston, where she will prepare for her trial trip next Thursday. The *Denver* is in charge of Capt. Chase, who commands the large steam yacht *Josephine*. The trial course is in a direct line between Cape Ann and Cape Porpoise, Mass. The *Denver* is a protected cruiser of the 3,100-ton class and must come up to a speed of 16.5 knots. She has twin screws and is of 4,700 H. P.

In about three weeks most of the office force of the International Mercantile Marine Co. will be transferred from this city to New York. The Philadelphia office will also be moved from its present location on Walnut street, near Third, to the annex to the Land Title building, Broad and Sansom streets. Clement A. Griscom, president, and his assistants will have quarters on the seventeenth floor. Rodman E. Griscom, manager of the company, will remain in this city. It has not been decided as yet whether Secretary Emerson E. Parvin and Treasurer James S. Swartz will remain in this city or go to New York, but most likely the latter. In shipping circles the significance of the transfer is thought to be that J. Pierpont Morgan wants the main office of the company at 71 Broadway, New York, to be the American headquarters of the concern. The directors have met in New York and the vice-president's office is in that city. Under the new plan President Griscom will spend much more time at the New York office than has been his custom heretofore, and the bulk of the company's business will be transacted in that city. Officials of the company are reticent concerning the details of the change. The officers of the company are: Clement A. Griscom, president; P. A. Franklin, vice-president; Emerson E. Parvin, secretary; James S. Swartz, treasurer; directors, Clement A. Griscom, P. A. B. Widener, B. N. Baker, John S. Waterbury, Edward J. Berwind, George W. Hawkins, James H. Hyde and Charles Steele. Sir Clinton E. Dawkins is chairman of the British committee composed of W. J. Pirie, J. Bruce Ismay, Henry Wilding and Charles F. Lorrey of London.

The entire dredging plant owned by the government at Hell Gate will be brought to this port this week to be put in shape to begin the work of removing Schooner ledge. Capt. Sanford, United States engineer in charge of the work, says that owing to the lateness of the season and the time required to put the dredging plant in shape, work will not start until early spring. In compliance with the unanimous demand for a 35-ft. channel in the Delaware, Capt. Sanford said Schooner ledge would be removed to a depth of 35 ft. That the government intends to own a permanent dredging plant on the Delaware is shown by the purchase last week from the T. A. Gillespie Co. of New York of the hydraulic pump dredge *Uncle Sam* at a cost of \$15,000. This includes the cost of fitting the new scow on which the pump is

set with new boilers. Capt. Sanford left Philadelphia for San Francisco Saturday night to inspect the operation of the converted suction dredge *Grant*. He will be gone several weeks.

In line with the disposition of commercial bodies all over the country to encourage the enactment by congress of some measure of assistance for our foreign-trade shipping, the executive council of the Philadelphia board of trade on Monday adopted a resolution expressing the "hope that through the careful consideration of all issues involved there may be developed, by our national legislative and executive departments, a wise and efficient plan for the creation of a suitable American merchant marine, built, owned, officered and, as far as may be, manned by American citizens." The executives empowered the committee on foreign and coastwise commerce, which has such matters directly in hand, to take such steps as may be deemed wise and necessary in pleading with congress to adopt a shipping measure. The committee on foreign commerce had already put the matter up to the executive council in a report strongly favoring government assistance for shipping, and the earnest support of this strong trade organization may therefore be expected in the general movement.

Capt. W. S. Samuels has announced his candidacy for the place of director of the Maritime Exchange, recently made vacant by the resignation of George E. Earnshaw. Capt. Samuels is a surveyor here for Lloyd's. His father was skipper of the old clipper *Dreadnaught*, which plied between New York and Liverpool in the early '50s. The next regular meeting of the exchange will be held Oct. 26, and as the captain has the almost unanimous endorsement of members, it is likely he will be elected.

The passenger and freight steamer *Mary Vinyard* was launched at Milford, Del., last Saturday by William Vinyard, her owner and builder. The vessel is 112 ft. long, 24 ft. beam and 7½ ft. depth of hold. She will be propelled by engines of 300 H. P., and when completed will run between Philadelphia and Milton.

The barge *Saxon*, with a carrying capacity of 400,000 ft. of lumber, has been purchased by the Export Lumber Co. and she will be towed by the steamer *Aragon* between this port and Georgetown, S. C.

NAVAL ARCHITECTS AND MARINE ENGINEERS.

Secretary W. L. Capps announces that the eleventh general meeting of the Society of Naval Architects and Marine Engineers will be held in New York Thursday and Friday, Nov. 19 and 20. Through the courtesy of the American Society of Mechanical Engineers, the meeting will again be held in the auditorium of No. 12 West Thirty-first street. Members intending to propose candidates for membership can secure blank forms of application by addressing the secretary. The applications should be returned to the secretary on or before Nov. 17. The banquet will take place at Delmonico's at 7 p. m. Friday, Nov. 20. The list of papers to be read at the meeting follows:

1. "Progressive Trial of Ferry Boat Bremen," by Col. Edwin A. Stevens, vice-president.
2. "The Isthmian Canal," by Civil Engineer A. G. Menocal, U. S. N. (retired).
3. "Notes on the Arrangement and Construction of Steam Pipes and Their Connections," by R. C. Monteaige, member.
4. "Gasoline Engines for Marine Propulsion," by D. H. Cox, member.
5. "Some Thoughts on the Design of Modern Steam Yachts," by Clinton H. Crane, associate.
6. "Watertight Subdivision of Warships," by Commander Wm. Hovgaard, royal Danish navy, member.
7. "Non-corrosive Nickel Steel Boiler Tubes," by Albert Ladd Colby, Esq.
8. "Curves of Form of the Initial Condition," by George C. Cook, member.
9. "The Metric System in Relation to the Ship Building Industry of the United States," by Naval Constructor J. H. Linard, U. S. N.
10. "Electricity in Manufacturing Plants," by W. M. McFarland, member of council.
11. "Description of the Design and Building of the 21,000-ton Steamships Minnesota and Dakota," by Charles R. Hanscom, member.
12. "Ships' Forms Derived by Formulae," by Naval Constructor D. W. Taylor, U. S. N., member of council.
13. "Some Notes on the Performance of the Torpedo Vessels of the United States Navy at Sea," by Lieut. L. H. Chandler, U. S. N.
14. "Notes on the Launching of the Cruiser Chattanooga," by M. S. Chase, member.
15. "Notes on Side Launchings," by Assistant Naval Constructor W. G. Groesbeck, U. S. N.
16. "Launching of Large Merchant Vessels," by W. A. Fairburn, member.
17. "Displacement and Stability Calculations," by Professor W. S. Leland, member.
18. "Graphic Calculations of a Ship's Stability," by Professor M. H. Bauer, member.

It is understood that the Great Northern Steamship Co. will build a huge sea wall at Smith's Cove, Wash., to protect the company wharves. It will be built of concrete and stone.

WORK OF TURBINE COMMISSION.

It is Begun at Parsons' Establishment—Turbine Steamer for Allan Line
Atlantic Service—New British War Vessels—Glasgow Letter.

Glasgow, Oct. 12.—The Cunard turbine commission has visited the establishment where Parsons' turbines are constructed for the propulsion of ships; and there the case for this form of motor was placed before the commission. This is the turbine with which there is by far the greatest amount of experience in both naval and mercantile ships; but it is not the only system in evidence. The French government has had a small torpedo boat fitted with the Parson turbine of French origin; but conclusive results have not yet been realized, owing to the boilers not being of sufficient steam-generating capacity to enable the turbine to be tested to its highest power. The British admiralty has now ordered a small turbine on this system for experiment, to be fitted for running fans. Prof. Rateau prefers the multiple action turbine, the best known of which is the De Laval. His turbine, known as the multi-cellular, is composed of several sheet-iron wheels fixed on the same shaft, the diameter of the wheels ranging up to 39 or 40 in. These wheels are separated from each other by circumferential diaphragms, held in grooves inside the turbine casing. The steam impinges on nickel steel blades on the periphery of the wheels, being by the guidance of fixed blades on the diaphragms passed expansively to each successive wheel in the series, and there may be as many as thirty of these. It is claimed that in this way the loss by leakage is practically nil; and, further, that the design makes it possible to use steam very highly superheated, which confers economical advantages. The steam consumption is put at 14 lbs. per electric horse power per hour, which is exceptionally good.

James & Alexander Allan have ordered from Workman, Clark & Co. a turbine-driven steamer for the Canadian service of the Allan Line. This will be the first turbine liner on the Atlantic. She is to be 520 ft. long, 60 ft. beam and 42½ ft. depth, with accommodation for 1,300 passengers. As originally designed for twin screws and triple-expansion engines she was to have a speed of 16 knots, but with the turbines a speed of 17 knots will doubtless be obtained.

SHIPS FOR CANADIAN TRADE.

The steamship Neepawah, recently built by the Grangemouth & Greenock Dockyard Co., Greenock, for the New Ontario Steamship Co., Hamilton, Ont., and engaged by Kincaid & Co., Greenock, ran her loaded trials a few days ago, when a speed of 12½ knots was attained on a mean of six runs over the measured mile. She immediately thereafter went into her loading berth, and took on board a cargo for the northwest territory of Canada. This vessel has been specially designed for the Canadian lake service and St. Lawrence canal traffic, provision being made for strengthening and protecting her for entering and leaving the locks, and she has been fitted with all the most modern requirements for this trade. When at work this vessel will carry a dead weight of about 3,000 tons on a draught of 16 ft. Her hull and engines have both been classed to British Corporation requirements. She has now left on her maiden voyage. Neepawah is an Indian name, which, I understand, means "a land of plenty."

A contract has been concluded between M. Gustave Colombier of Bordeaux and the Canadian government for the establishment of a line of steamers between France and Canada. By this contract M. Colombier undertakes to provide four steamers (two under the British and two under the French flag) to trade between France, Quebec and Montreal. These vessels are to have the option of loading or discharging in any part of continental Europe, provided that the final port of departure for Canada be a French one, but they are not to visit any British port save for bunkering purposes. The service is to begin April 1, 1904. The Canadian government accords a subsidy of \$100,000 per annum for ten years for eighteen voyages, with a *pro rata* increase up to \$133,333 for a maximum of twenty-four voyages during the year. At the end of the first five years the Canadian government may extend the contract for another term of five years. It is intended to purchase the ships in the United Kingdom, and they will carry emigrants.

NOT AN ENCOURAGING SHIP BUILDING OUTLOOK.

The last quarter of the year has opened with a severe shake in the pig iron market, due to a collapse in the stock market and to discouraging advices about the iron market in America. Ship building material, however, is not quotably cheaper. Ship builders have booked only a fair amount of work during the last two or three weeks. Contracts placed in September with Scotch ship builders amount to about 46,000 tons as against 32,000 tons of new vessels put into the water—a small output compared with 73,600 tons in August.

The admiralty has just received tenders for the construction of the torpedo boat destroyers included in this year's program. No Clyde firms are included, the admiralty preferring that our firms should confine themselves to larger vessels. The prices at which the destroyers will be placed will range from £75,000 upwards. Fifteen of them are to be built. They are to be the same as those now on order from Palmer of Jarrow, Laird of Birkenhead, Hawthorn, Leslie & Co. of Newcastle and Yarrow & Thornycroft of London. The length is 255 ft., the displacement 540 to 550 tons, and the designed speed of 25½ knots must be attained with an engine power not exceeding by 5 per cent. that guaranteed. The chief characteristic of the vessels is their high forecast-

tle and greater sea-going quality, as compared with the earlier destroyers of 27 and 30 knots speed. Tenderers have been requested to submit designs of machinery on the forced lubrication principle, so that the working parts of the engines may be enclosed.

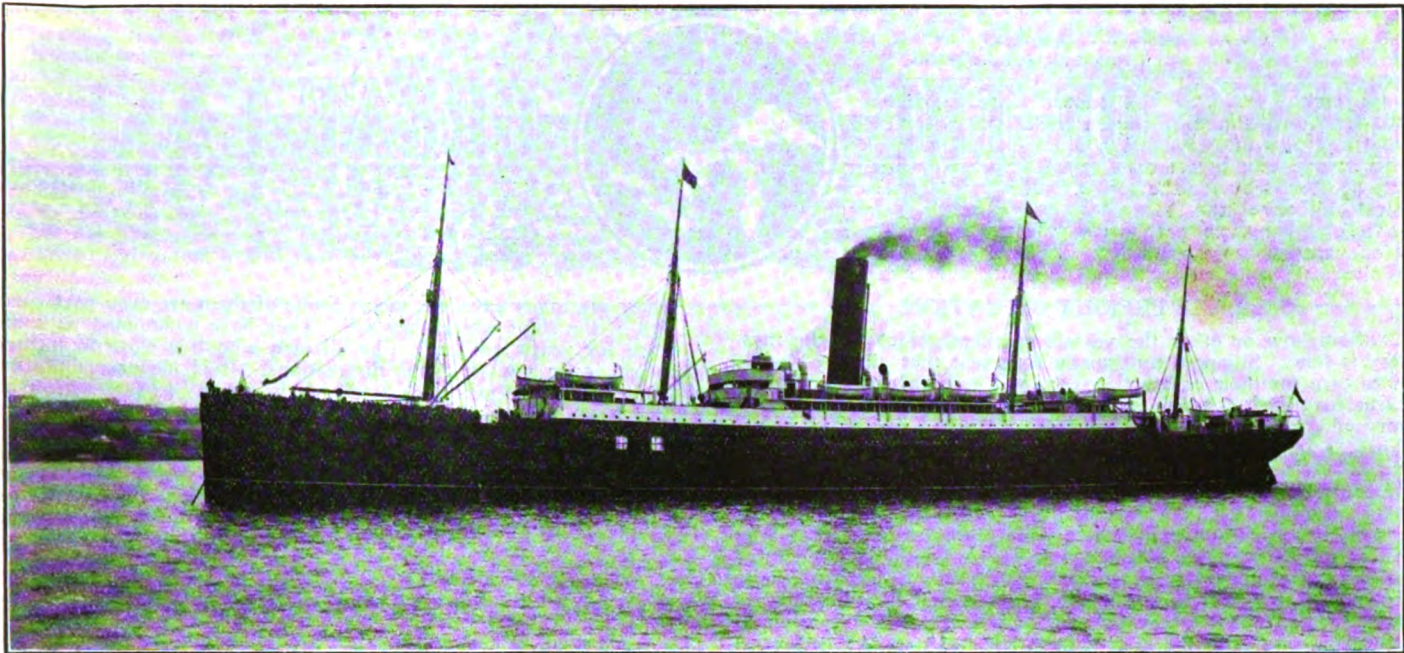
NEW TYPE OF BRITISH CRUISER.

First and foremost among new orders which the Fairfield Ship Building & Engineering Co., Ltd., has received from the admiralty is the contract to build and engine one of the three cruisers of the Duke of Edinburgh class for which tenders were recently asked. This class are the first British cruisers designed since Sir Philip Watts succeeded Sir William White as director of naval construction. The Duke of Edinburgh, which gives the name to the class, was laid down at Pembroke dockyard in February of this year, and another, the Black Prince, is now building at the Thames Iron Works. The dimensions of the class are: Length, 480 ft.; beam, 73½ ft.; draught, 27 ft.; displacement, 13,520 tons; horse power, 24,000 indicated; speed, 23 1-3 knots; coal capacity at load draught, 1,000 tons.

These vessels are of slightly less displacement, horse power and speed than the Drake class, but carry heavier armament. In the Duke of Edinburgh class Sir Philip Watts designed a new type which combines the protection of a second-class and the armament of a first-class battleship with the speed of a cruiser. The principal innovations in the design are the substitution of four 9.2-in. for six 6-in. guns, and a central citadel for the protection of the secondary armament. The new type more closely approaches the battleship type than any other cruiser. The citadel will extend for about three-fifths of the length of the vessel, and the side plating will be of 6-in. cemented armor from about 5 ft. below the water line right up as far as the main deck. On the water line there will be, forward and aft, the citadel to the bow and the stern, armor plating tapering from 4 in. to 3 in. in thickness, the usual armored bulkheads forming the bow and stern athwartship walls of the citadel. The armored deck will be curved to the bottom of the side plating, thus increasing the effective protection on the broadside against gun attack. At each corner of the citadel thus formed there will be mounted a 9.2-in. (27-ton) gun, and in addition a gun of the same caliber will be mounted forward and another abaft the citadel. These two will have gun houses of 6 in. armor protecting the gun mountings and other mechanism, with an armored floor and an armored ammunition tube. There will thus be afforded the maximum of protection to the isolated guns. This arrangement will enable three of the guns to fire ahead and three to fire astern, without interfering with each other's sighting. In addition to these six large guns, there will be mounted ten quick-firers of 6 in. caliber, five on each broadside on the main deck, between the 9.2-in. guns at the ends of the citadel. All the guns within the citadel will be separated from each other by traversers with splinter screens behind, so as to localize the effect of shells which may penetrate the 6-in. armor and explode within the citadel. The 9.2-in. gun has a rate of fire of four rounds per minute and a muzzle energy of 18,400 foot-tons; the 7.5-in. five rounds per minute, with an energy of 10,120 foot-tons; and the 6-in. quick-firers, eight rounds per minute, with an energy of 4,840 foot-tons per minute. Although the displacement of the Duke of Edinburgh class is less than that of the Drake class (of which the Good Hope was built at Fairfield and the Leviathan at Clydebank), being 13,520 tons as compared with 14,100 tons, there is an increase in the weight of shot which may be fired per minute of from 15,840 lbs. to 17,120 lbs., and in the total collective muzzle energy of from 766,720 to 828,800 foot-tons. Among vessels now building or recently completed for foreign navies, those which approximate most closely to the Duke of Edinburgh class are the French cruisers of the Victor Hugo class, which are of 12,351 tons, 27,500 I. H. P. and 22 knots speed and carry four 7.6-in. and sixteen 6-in. guns; and the United States cruiser California of 13,680 tons, 23,000 I. H. P., 22 knots speed, and which carries four 8-in. and fourteen 6-in. guns.

The Central Marine Engine Co., West Hartlepool, has been experimenting with superheated steam, and the boilers of the new steamer Queensborough have been fitted with one of their improved Central superheaters, with, I hear, the most gratifying results. The amount of superheat obtained on the trial of the vessel was more than sufficient and had on two occasions to be modified; after proper adjustment the temperature was maintained about 500 degrees Fahr. No deleterious results seemed to occur either to the cylinders or to the lubricants. Although no absolutely accurate results were obtainable, it was estimated that the saving in fuel was at least 10 per cent. On the completion of the first voyage there will be a full report of the working of the apparatus.

Mr. Ernest L. Harris, consul to Eibenstock, Germany, writes as follows concerning trade papers to the state department at Washington: "What the trade journal accomplishes for the interstate commerce of any one country certain journals now in circulation are accomplishing for international commerce. The American trade journals on file in the various consulates, chambers of commerce, and other merchant organizations in Europe are unquestionably furthering the interests of our export trade. The advertisements in them may not always produce business at the outset but they lead to inquiries along certain lines of manufacture which, if carefully answered, lead to the desired trade openings abroad."



Steamship Carpathia of the Cunard Line.

THE CUNARD LINER CARPATHIA.

On this page is a photograph of the Carpathia of the Cunard Line, which has just entered the Mediterranean service of that line, having been transferred from the New York-Liverpool service. The Carpathia is a product of 1903. She is distinguished among the ocean liners in that she was built for the second-class service. Her first-class accommodations are given over to the second-class. She is not a flyer; neither is she a slow ship. She is both comfortable and fairly fast. This service is decidedly new on the part of the Cunard Line, and as the Carpathia carries only second-class and steerage passengers it is evidently the intention of the Cunard Line to make a hot fight for the Italian and Russian emigrant trade. The new service will take in Gibraltar, Genoa, Naples, Palermo, Trieste, Flume and possibly Algiers. The conference agreement from which the Cunard Line withdrew last summer provided that the British lines should be allowed full sway in regard to the British and Scandinavian steerage business in consideration of the British lines leaving the continental and Mediterranean business to the continental lines. This arrangement was entered into at a time when the Scandinavian business was very heavy, and it was considered an equitable division. When the Scandinavian-American Line entered the field a readjustment was considered necessary by the Cunard company. This not being granted, the Cunard Line withdrew and announced its intention of entering the Mediterranean field. The Aurania will divide the work with the Carpathia and two more vessels of the Ivernia class have been laid down for this service.

USELESS TRIPS.

Mr. Charles M. Schwab in the days of his strength said that the chief difficulty of the United States Steel Corporation would be to find a man to manage it. He said this in the early days of the Steel Corporation, shortly after it had been formed in fact, and before there was any suggestion of his rapid downfall, and it shows that he realized the inherent weakness of such a vast aggregation of industries. The trouble with it is that it is so big, that it is so widely scattered; that it is owned by no one in particular and that there is no one especially to look to for censure or for praise. Mr. Schwab himself was all right when he was working for Mr. Carnegie. It is clear that he must have been an entirely different sort of man as president of the Carnegie company than he was as president of the United States Steel Corporation. He was with the Carnegie Steel Co. for nineteen years; but he was with the United States Steel Corporation for only two. Mr. Schwab is doubtless right. The great difficulty with the Steel Corporation is to find someone to manage it, someone who will make the presidents and general managers of the subsidiary companies attend to their duties as though their lives depended upon it. It is so big as to resemble a principality and it is known that governments are not managed with the scrupulous care that private business is. But no private corporation, no matter how large or how powerful it is, can withstand the honeycombing of graft, the neglect of its officials and the extravagant and useless expenditure of money. Who ever heard of the officials of the Standard Oil Co. making a spectacular trip on a special train, well stocked with viands, to inspect their oil wells. If they ever went at all they went with gum shoes. Why do the officials of the Steel Corporation make these theatrical descents upon blast furnaces and rolling mills, heralding their approach with a great blare of trumpets. Do they expect by these means to catch the honest workman unawares? What earthly good are these expensive trips? The claim will probably be made in the aggregate of earnings this expense is not a drop in the bucket, but it is

the little drops of water which make the mighty ocean. The Steel Corporation's raw material simplified is pig iron. So much revenue must come out of every ton of pig, and if one will take the trouble to compute it he will discover that every ton of pig must make a heavy profit to pay the fixed charges on stocks and bonds. The burden upon the individual pig should be lessened, not increased. The point is that no corporation has enough money to indulge in useless expenses; no corporation can have too big a surplus; that nothing more reassuring than a surplus has ever yet been invented; that the corporation should bend its energies to strengthening itself and its personnel in every department, and that it were as equally useless to read reams of financial literature to a man in the mechanical department as it were to carry about the country a financier, who, if suddenly asked the question, could not differentiate between a Bessemer converter and a Hulett clam-shell.

NAVAL ESTIMATES OF \$102,866,449.

The increase of \$26,846,568 in the naval estimates for the fiscal year ending June 30, 1905, over the appropriation for the current fiscal year, is due mainly to a large additional amount for continuing the construction of war vessels already authorized, for the armor and armament of these vessels, for continuing work on the new buildings at the naval academy, for public works at navy yards and stations, including dry docks, and the fitting up of new naval stations in Cuba, and for the greater amount of coal needed to run the rapidly increasing fleet. The summary of the estimates is as follows:

| | |
|---------------------------------------------------------|---------------|
| Pay of the navy | \$ 19,824,093 |
| Pay, miscellaneous | 600,000 |
| Contingent, navy | 15,000 |
| Emergency fund | 50,000 |
| Bureau of navigation | 1,363,886 |
| Bureau of ordnance | 3,776,700 |
| Bureau of equipment | 6,497,903 |
| Bureau of yards and docks | 922,884 |
| Public works, bureau of yards and docks | 8,164,874 |
| Public works, bureau of navigation, naval academy | 3,000,000 |
| Naval training station, Rhode Island | 14,000 |
| Naval war college | 8,125 |
| Naval station, Great Lakes | 250,000 |
| Public works, bureau of ordnance | 248,900 |
| Public works, bureau of equipment | 7,800 |
| Public works, bureau of medicine and surgery | 20,000 |
| Bureau of medicine and surgery | 360,000 |
| Bureau of supplies and accounts | 5,203,932 |
| Bureau of construction and repair | 8,595,824 |
| Bureau of steam engineering | 3,572,900 |
| Naval academy | 314,588 |
| Marine corps—paymaster | 2,118,875 |
| Quartermaster | 1,690,290 |
| Increase of the navy—construction and machinery | 28,826,860 |
| Armor and armament | 12,000,000 |
| Equipment | 400,000 |
| Total | \$102,866,449 |

Harland & Wolff, Belfast, Ireland, deny that they have entered into contract with the United States Steel Corporation for ship plates for all the ships that they may build. The statement that such a contract had been made was generally circulated in New York.

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LAKE FREIGHT SITUATION.

Somehow or other the vessels are kept going, but the mystery is how. Shippers continually represent that all they can do is to care for their contract vessels, and even this at times keeps them juggling. Brokers are having a hard time placing vessels for wild cargoes, and yet somehow or other they keep going. They are reluctant to seek the dock as long as there remains the smell of a cargo. The lumber trade is the one luminous ray, but, of course, its iridescence falls upon but a small part of the tonnage. Lumber shippers are willingly paying the advance in the association rates and in special instances it is reported that even better rates have been obtained. Stress of weather has operated to stiffen this phase of the market. The seas have been unusually ugly, even for this time of year, and as the lumber craft are mostly small vessels they have exercised reasonable caution in venturing out. But the rest of the trade lacks spirit. In fact, it is as dead as the proverbial door nail. The Steel Corporation has notified those with whom it has contract tonnage that it will endeavor to stop shipments on Nov. 15 and to contrive to take all the ore that is coming to them before that date. As far as the furnaces are concerned, it is as though some strange epidemic has simultaneously seized upon their mental processes and induced in them a singular repugnance to iron ore. They are written in letters manifesting a willingness to live up to their contracts, but requesting that orders, now unfilled, be carried over until next season. Coincident with this attitude of the furnaces some of the ore mines are shutting down and it is probably true that more will cease shipping on Nov. 1 than has characterized the industry for several years past. There is no change in rates nor thought of any. Instead of an ascending scale, as in former years, when the season is at its tail end, rates are merely hanging together because there is nothing to be gained by cutting them. The fall season, instead of being rampant with life, has degenerated into a state of innocuous desuetude and the prediction which has been regularly made for thirty years past that there is too much tonnage on the lakes seems to have come true at last, at least temporarily so.

APPLICATION FOR PILOTS' LICENSES.

During the past week the newspapers have published an item of news to the effect that members of the Masters & Pilots' association have determined not to sign the application of young men aspiring to become first and second officers until their organization, through some one of the local harbors, has approved the application. It is to be hoped, for the sake of the honor of the Masters & Pilots' association, that such is not seriously the purpose of the association. Putting it very plainly, it amounts to a conspiracy against the rights of an American citizen. It is a denial to others of privileges which they themselves have enjoyed—an attitude which is decidedly unAmerican. Nor is there the least reason to believe that such an attitude, if persisted in, would be tolerated for a moment by the federal government. The law provides that, if practicable, the applicant's petition must be signed by two first-class pilots and one engineer, or three first-class pilots without the engineer. The section reads: "And inspectors will, before granting an original license to any person to act as an officer of steam vessels, require the applicant to make his written application upon the blank form authorized by the board of supervising inspectors, which application shall be filed in the records of the inspector's office. Inspectors shall also, when practicable, require applicants for pilots' license, to have the written endorsement of the master and engineer of the vessel upon which he has served, and of one licensed pilot as to his qualifications. In the case of applicants for original engineer's license, they shall also, when practicable, have the endorsement of the master and engineer of a vessel on which they have served, together with one other licensed engineer."

It will be noted at once that the saving words in this paragraph are "when practicable." If it is not practicable for the applicant to secure these endorsements he may obtain his license without them, and there are instances on record where such has been done. It is true that the Masters & Pilots' association has, at its annual session in Washington, recommended to the board of supervising inspectors, which usually meets at the same time, that these two words be stricken out of the section, but, of course, the act would then leave the inspectors without powers of discretion, and they quite naturally do not care to apply the shears to themselves. Of course it is essential that every applicant for license should be competent and no one knows his competence better than the master and engineer with whom he has sailed. The law requires that he shall have sailed for three years, two of them in the pilot house, before a license can be given to him.

Among the members of the Masters & Pilots' association

there are many excellent men. Some of them are even part owners of the ships which they sail. They have communed with nature for years and have, like all men who live close to nature, broad, open and generous dispositions. It is inconceivable that these men could take such action, or be a party to such action, as has been outlined during the past few days in the newspapers. The law does not say that the local harbor board shall endorse applications or that it shall sit in judgment upon them. In fact, in taking such action as the newspapers speak of it would very probably render itself amenable to the law for conspiracy in restraint of trade; and it is perfectly clear that the federal government would take such immediate and drastic action as the association would not forget.

CHICAGO GRAIN REPORT.

Chicago, Oct. 21.—The grain movement of the past week is somewhat under the previous week, but the up-freight trade has been so much slower that vessel offerings have been much reduced and the general tone is considerably stronger. Rates have been held steady at 1½-cent wheat, 1¼-cent corn and 1½-cent oats to Buffalo, Port Huron and Georgian Bay, with Kingston nominally 3 cents corn and Montreal 4½ cents.

The eastern cash situation seems favorable, on account of the steady decline in corn prices, coupled with continued low cost of lake and ocean transportation. Aside from this, the next few weeks should be a natural period for heavy eastern shipping; and another feature of probable strength is the fact that vessel owners are inclined to terminate the operation of non-contract capacity unless carrying charges are shortly adjusted to a fair profit basis.

Corn receipts are ruling a little slow for the present, and wheat also, under strong speculative influence, due to active milling inquiry and light stocks at receiving points. Some five or six cargoes of wheat and flax have been received here via lake from Duluth, and it is reported that a few more are to follow.

Of the shipments noted below in week just closed there was via rail 513,000 bu. wheat, 120,000 bu. corn and 800,000 bu. oats; via lake to Buffalo and other American points, 250,000 bu. wheat, 2,500,000 bu. corn and 600,000 bu. oats; to Canadian points, via lake, 80,000 bu. wheat, 500,000 bu. corn and 75,000 bu. oats. The shipments lake and rail are as follows:

| | This week. | Last week. | last year |
|-----------------|------------|------------|-----------|
| Wheat, bu. | 856,720 | 893,604 | 402,635 |
| Corn, bu. | 3,201,887 | 4,049,122 | 809,642 |
| Oats, bu. | 1,467,660 | 1,084,805 | 615,721 |
| Rye, bu. | 8,041 | 15,155 | 48,403 |

Total, bu. 5,534,308 6,042,686 1,876,401

Since Jan.
1, 1903.

| | Same time last year. |
|-----------------|-----------------------|
| Wheat, bu. | 17,375,033 26,050,295 |
| Corn, bu. | 75,081,991 35,376,176 |
| Oats, bu. | 52,562,011 44,375,244 |
| Rye, bu. | 3,048,804 2,069,234 |

Total, bu. 148,067,839 107,870,949

Stocks of grain in public and private elevators are thus reported:

| | Week just closed. | Last week. | Same week last year. |
|-----------------|-------------------|------------|----------------------|
| Wheat, bu. | 5,589,000 | 6,128,000 | 9,469,000 |
| Corn, bu. | 4,707,000 | 5,025,000 | 1,281,000 |
| Oats, bu. | 2,489,000 | 2,714,000 | 4,375,000 |
| Rye, bu. | 600,000 | 560,000 | 296,000 |

Total, bu. 13,385,000 14,427,000 15,421,000

NORTHWESTERN GRAIN MATTERS.

Duluth, Minn., Oct. 21.—Grain stocks at Duluth-Superior increased last week more than 2,130,000 bu. and now stand at 6,585,380 bu. This increase is rather remarkable, considering eastern demand, of which much has been said, and claimed sales of wheat. Wheat alone increased 750,000 bu. for the week. Flax increased more than 1,000,000 bu. for the week, showing the great volume of grain other than wheat that is coming in here now. If the present rate of increase continues elevators will make a better showing for the year than has been anticipated. Total shipments from this port for the week, all grains and including withdrawals to elevators of 248,659 bu., have been 2,311,469 bu.

So much Canadian northwest grain is so damaged that both roads hauling to Port Arthur and Fort William are blocked with

it. The sidings are full and more than 100 cars have accumulated in the C. N. R. yard. King's hospital elevator at Port Arthur is kept busy day and night with wet wheat from the C. P. R. alone. The question of its disposition is becoming embarrassing, especially to the C. N. R., which has no hospitals. Receipts of grain at the C. P. R. country elevators in Northwest Canada are running about 350,000 bu. daily and will be up to 400,000 bu. in a week or so. On the C. N. R. line they are about a third as much.

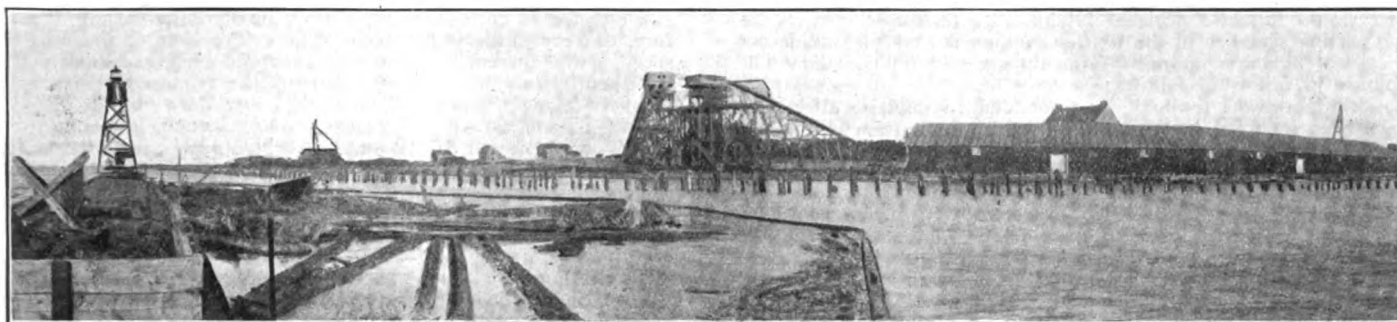
The Canadian canal at the Sault last Monday passed 481,000 bu. of wheat, its biggest day. Eight ships, seven of them Canadian, carried this quantity. The average cargo of the Canadian

ent entry, now 300 ft. wide, is to be increased in width.

This entry will give direct approach to Allouez bay, where are now the Great Northern Railway ore piers, the Northwestern Coal Railway wharf and the Chicago, St. Paul, Minneapolis & Omaha elevator and freight sheds. It also gives a near approach to all dock front at old Superior.

STRANGE WRECK OF THE MARQUETTE.

The old wooden steamer Marquette, owned by J. C. Gilchrist of Cleveland, foundered in Lake Superior on Thursday last under most singular circumstances. The lake was like a mill pond



General View of New Work in Progress at Superior Entry, Head of Lake Superior, Taken from the Inner End of Old South Pier.

ships was only 53,000 bu. Canadian northwest grain is moving in quantity now and is sure to exceed that from Duluth.

Navigation companies are giving notice of their final sailings. The Lake Superior & Lake Michigan Line will send its final shipping from Chicago for Duluth Nov. 15. Most of the cargo ships will be off the lakes by that time, as it is considered certain that the ore movement will be through then. Flour and grain carriers will be busy as late as usual.

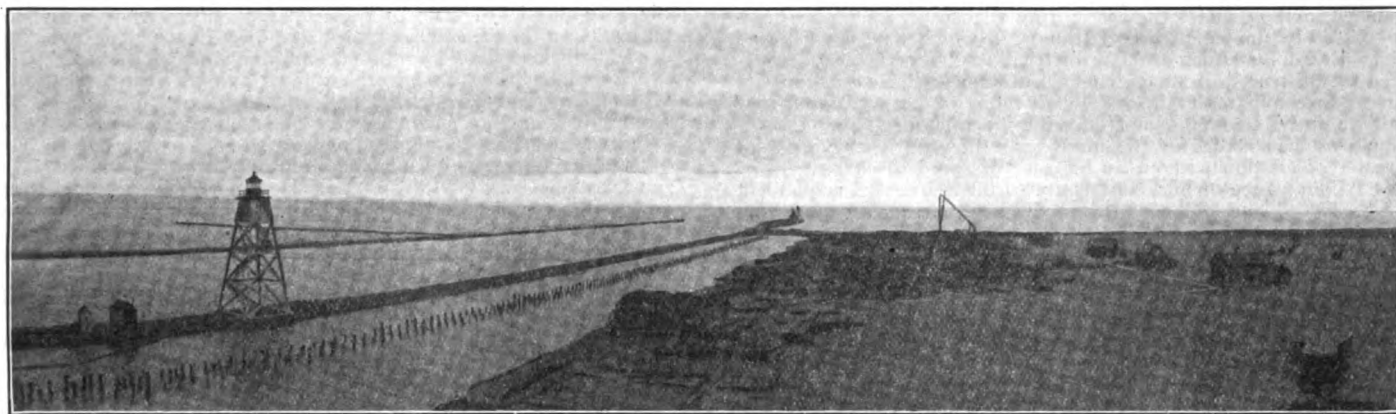
The Tomlinson steamer Somona took from the Superior Terminal elevator a record-breaking cargo of flax, amounting to 260,000 bu. This is 3,000 bu. more than her last load. The Tomlinson interests have just filed articles of incorporation for the Globe Steamship Co., capital stock \$200,000, limit of indebtedness the same.

GREAT CONCRETE PIERS AT SUPERIOR.

Duluth, Oct. 21.—The government is well along with preliminary operations for its great concrete piers at Superior entry, head of Lake Superior, which are to cost about \$1,000,000. Much of the piling for the foundation of the new south pier is completed and sawn off below water level. Many buildings for shops,

when at midnight the steamer sprang a leak and plunged to the bottom, scarcely allowing the crew time to take to the small boats. The Marquette had left Ashland at 4 o'clock in the afternoon with a cargo of iron ore for Cleveland. At midnight it was observed that the steamer was leaking and all hands were summoned to the pumps. They were utterly inadequate, however, to cope with the rush of water into the hold. When the steamer had reached a point 25 miles east of Michigan island, the situation became alarming and Capt. Chaughill changed his course to beach the vessel. Ten of the crew, fearing that the steamer could not remain much longer afloat, took to the small boats, leaving four men to battle with the ever-increasing water alone. When within 5 miles of the shore the process of sinking became imminent and the captain and remainder of the crew jumped overboard into the yawl. By this time the Marquette was trembling violently owing to the pressure of the air compressed beneath her deck by the incoming waters. In a few minutes her timbers began to crack and then the deck was blown out as though by an explosion and the mainmast lifted bodily into the air. The Marquette shot bow foremost to the bottom. The crew, thereupon, rowed to Ashland.

The Marquette was formerly the Republic. She was built



General View Taken from Top of Concrete Mixer, Looking Lakeward.

warehouses, storage and the like are erected and filled with material, more than 1,000,000 ft. of fir timber for cribs, etc., is on the ground, moulds for concrete are built and ready, a great concrete mixer is built and connected with gravel banks and washeries, locomotives, cranes and other machinery is ordered, and everything must be ready by spring for actual construction of the piers. The work will take at least three years. Contrary to the usual custom, it is to be by day labor under direct charge of the Duluth office of the corps of army engineers. Bids for this concrete work were considered several hundred thousand dollars too high and the authority of the secretary of war was given for the day labor method that is to be pursued. Contracts have been let for dredging the channel in which the piers will set, for pile driving, for cement, and for slag portland made by the Illinois Steel Co. Most of the supplies are on the ground.

The large building in view No. 1 is the cement warehouse, with the concrete mixer close by it. Other buildings are for various parts of the work. View No. 2 shows the old piers, and the line of piling inside the south pier indicates how much the pres-

ent at Cleveland by Presley for the Republic Iron Co. in 1881, and was 235 ft. keel and 35 ft. beam. In 1890 she was sold to the late Capt. John W. Moore. When the vessels of the Moore fleet were sold a few years ago Mr. Gilchrist bought the Marquette, Colonial and Siberia. The Marquette was insured for \$30,000.

Capt. Frank Rae, whose non-membership in the Masters & Pilots' association caused the recent tie-up of the Steel Corporation vessels for a few days, has decided not to apply for membership in the association. He is now the assistant superintendent of the Steel Corporation fleet of vessels. He was at the time of the trouble the master of the steamer Clemson.

Maj. Dan C. Kingman, government engineer at Cleveland, says vessels are passing in and out of the harbor at Cleveland too near to the western arm of the breakwater now being constructed. Several tons of stone intended for rip rap purposes are lying there, yet vessels come so close as to knock the buoys away. The stones are covered by only 15 ft. of water.

DECISION IN DRAINAGE CANAL CASE.

So Important to Vessels Trading to Chicago that Appeal will be made to Highest Court—The full Opinion.

So much is involved in what is known as the Arabia case, in which an opinion was given recently by Judge Kohlsatt of the United States district court, Chicago, and which relates to the right of vessel owners to collect damages from the Sanitary District of Chicago by reason of the current in the Chicago river, that it will be taken at once by the vessel owners to the circuit court of appeals, and no doubt an effort will be made to get it into the supreme court of the United States whatever may be the decision of the court of appeals. Evidently Judge Kohlsatt was largely influenced in his conclusions by the heavy damages that would follow a decision favorable to the vessel owners, as the parting sentence in the written opinion is that they made out a case of *damnum absque injuria*—injury without damage. The opinion in full is as follows:

Libelant seeks to hold the respondent for damages alleged to have been incurred in towing the barge Algeria from elevator C on the Chicago river west of Halsted street to a point near the mouth of the river, by reason of the current created by respondent's canal or drainage channel. The barge is 288 ft. long, has 44.6 ft. beam, and draws, when loaded, 16½ ft. of water. Libelant claims, first that the barge was delayed about twelve hours; second, that she incurred an extra expense of tug hire of \$323.03, and third that she sustained damages by the straining of lines and timber heads. These items, it is insisted, were all caused by the greatly increased rapidity of the current. Owing to this cause the tugs were unwilling to start with the barge until daylight on Oct. 5, 1900. She started down the river about 5 o'clock in the morning in charge of two tugs, one forward and the other at her stern. This, it is claimed, would have been adequate in a current not exceeding 1¼ miles an hour. In passing through the Halsted street draw a third tug was engaged—two forward and one astern. She was half an hour in clearing the bridge draw. The same trouble was repeated at each draw from Twenty-second street to Washington street. There a fourth tug was procured and the trip down the river was finally concluded. While the current offered considerable resistance all the way down, the greatest current was encountered at the bridges by reason of the constricted channel and the obstruction caused by the barge herself.

Libelant insists that respondent is liable for any damage caused by its acts in increasing the current, claiming incidentally that the increase was largely in excess of the 1¼ miles an hour alleged to be contemplated by the secretary of war. Respondent, on the other hand, claims that its acts in respect to an increase of the current were under the control of the government of the United States; that it was acting under the permit of the secretary of war, and that it committed no illegal act in accelerating the river current. By act of congress passed March 3, 1899, it was provided that it should be unlawful to modify the condition or capacity of the channel of any navigable water of the United States, "unless the work has been recommended by the chief of engineers and authorized by the secretary of war prior to beginning the same." This act covers the Chicago river. The respondent was organized in 1890, under the act of July 1, 1899, in reference thereto, passed by the legislature of Illinois, in which state the Chicago river is wholly situated. The district was, by said act, authorized to construct a drainage channel of sufficient size and capacity to produce and maintain a flow of water of 300,000 cu. ft. per minute and a current of not exceeding 3 miles per hour. Provision was also made for the increase of flowage in the event of greater population without an increase of speed of current.

In pursuance of and conformity to the above act, respondent proceeded to and did construct a drainage channel from Robey street, in the city of Chicago, in said state, to Lockport, Ill., a distance of about 28 miles, it being the intention to use the Chicago river from Robey street to Lake Michigan as a connection between said channel and the lake. On June 16, 1896, the respondent, by its president, made application to the secretary of war for permission to make such improvements and changes in the Chicago river as would meet the requirements of the said channel and the law under which it was constructed, and submitted therewith a map of the proposed changes. On recommendation of the government engineer, the secretary of war granted a qualified permission on certain conditions. Clause 2 of this permission provided that the authority granted should "not be interpreted as an approval of the plans of the Sanitary District of Chicago to introduce a current into Chicago river. This latter proposition must hereafter be submitted for consideration." Clause 4 provided "that the United States will not be put to expense by reason of this work." The other clauses are not pertinent here. Afterwards more complete plans were furnished by respondent, whereupon, on Nov. 16, 1897, upon the recommendation of the government engineer, the secretary of war approved the same and granted a permit subject to the same conditions as above set out.

Sometime prior to April 24, 1899, application was duly made to the secretary of war for leave to connect the said drainage channel with the Chicago river at the south branch thereof at said Robey street. This was referred to the chief government engineer. On May 8, 1899, the secretary of war granted permission to respondent to make such connection, subject to certain reservations, to wit: First, that the matter should be submitted to congress and the permit should abide its action there; second, that if at any time the current should be found unreasonably obstructive to navigation or injurious to property, the right was reserved to close or modify the discharge through said channel to such an

extent as may be demanded by navigation and property interests along said Chicago river and its south branch; third, that respondent must assume all responsibility for damages to property and navigation interests by reason of the introduction of a current in Chicago river. In January, 1900, the connection was made—since which time the water from the river and lake have flowed into the drainage channel. The current resulting from this flow is alleged by libelant to be the primary cause of the damage complained of.

It is evident that should the theory of libelant prevail, it would make respondent liable for any and all damages arising from the increased current, no matter how slight the increase. Not only navigation interests, but abutting property interests would be in position to make claim for damages, growing out of any increase in current. The matters involved herein are, therefore, of very grave importance. The evidence as to the rate of speed of the current is uncertain. It would seem to be fairly established by respondent's witnesses that the average or mean rate of speed along the whole line of the river does not exceed 1¼ miles per hour, as a result of a flow of 300,000 cu. ft. per minute. But at all congested points, such as bridge-draws and other narrow points, it is much greater, and when augmented by the displacement and resistance of vessels, this speed is further increased.

It would seem from the evidence that an average speed of even half a mile per hour would in such circumstances exceed 1¼ miles per hour. The only theory upon which this rate of speed, i. e., 1¼ miles per hour, is involved in this case is that respondent in its application for leave to make changes in the river, says: "It is desired to so correct and regularize the cross section of the river as to secure the flowage capacity of 300,000 cu. ft. per minute with a velocity of 1¼ miles per hour," and the recital in the engineer's recommendation to the secretary of war that the respondent's engineer estimates the mean current with 300,000 gallons per minute to be 1¼ miles per hour, which estimates he declares to be simply an assumption based on an unobstructed flow, together with the recital in the preamble to the final permit of the secretary of war, granting authority to connect the river and the channel, to the effect that the secretary of war has heretofore granted respondent permission to make improvements in the river "for the purpose of correcting and regulating the cross section of the river so as to secure a flowage of 300,000 cu. ft. per minute, with a velocity of 1¼ miles per hour." It will be seen that the secretary of war does not in any manner undertake to fix the rate of speed of the current, or the amount of flowage, but simply reserves the right to regulate the same, as experience may make desirable. The clause of the final permit above quoted, requiring the respondent to assume all responsibility for damages in the premises, can not be construed as meaning more than that whatever damages may legally arise are to be assumed by respondent. It does not create any liability, but would seem to have been inserted as an extra precaution. The secretary of war could neither create nor wipe out a legal cause of action. The liability referred to is a "legal liability" springing out of the "acts of respondent, existing, if at all, entirely independent of said cause." The issue then must be narrowed down to the single proposition: "Is the Sanitary District of Chicago liable for damages growing out of its manipulation of the Chicago river, such acts being done with the consent of the federal government and the state of Illinois?"

A number of cases have been cited holding that a party obstructing navigable waters is liable for damages resulting therefrom, but in each of such cases the obstruction was an illegal one—that is, not done under authority of the government. In the case at bar there was no illegal act on the part of respondent. The improvement was lawfully made. Had congress not legislated with regard to the Chicago river, the state would have the power to direct and control it, to the extent of closing it. Congress has, however, so legislated, but has through its proper officer released to a degree something of its control. To the extent of such release may it not be said that the state is reinvested with control. The act creating respondent—Sec. 7—provides that "the trustees of a sanitary district shall have power to provide for the drainage of such district by laying out, etc., one or more channels, etc., for carrying off and disposing of the drainage, etc., together with such adjuncts and additions thereto as may be necessary or proper to cause such channels or outlets to accomplish the end for which they are designed." It provides for the drawing of water from Lake Michigan, and in Sec. 27 enacts that if any such channel "receives its supply of water from any river or channel connecting with Lake Michigan, it shall be construed as receiving its supply of water from Lake Michigan." It would seem then that so far as the state had power it authorized the respondent to use the Chicago river. Can it be claimed that the government had not the power to permit such a use of the river, reserving the right to regulate that use, as it deemed consistent with the rights of navigation and property owners? Has the general government not the power to so reconstruct or change navigable streams, as it may deem best for the public use? Certainly if it has, it can permit others to do so. The drainage channel is a vast public improvement. The government has recognized it as such and permitted a reasonable use of the Chicago river in connection with it. It has reserved the power to control the flow of water. This power it may exercise at any time.

Whether or not it is within the power of the government to arbitrarily permit the increase of the current in a navigable river to such an extent as to make navigation thereon more tedious and expensive, it must be contended that the welfare of several millions of its citizens is a consideration which might well be pleaded

as a sufficient ground for a reasonable modification of the existing current. Were it either necessary or desirable to find other consideration it may be found in the act of incorporation itself wherein it is provided that when the channel is completed and 300,000 cu. ft. of water per minute turned therein, the same is declared to be a navigable stream, and that whenever the general government improves the Des Plaines river for navigation, to connect with the channel, said general government shall have full control over the channel, subject to the rights of the district for drainage purposes. It may well be assumed that the government, through its proper officers, had this in mind.

My conclusion upon the matter is this: By permission of the general government the respondents connected the channel with the south branch of Chicago river. Such permission was withheld until certain requirements were complied with. Respondent took all necessary legal steps and acted within the permit. Whatever damage accrued to libellant grew out of the congestion of the channel by reason of the bridge piers or abutments, which were not under its contract. There is no undertaking with navigators, express or implied, that the current of the river shall not exceed a certain rate of speed, except the 3-mile provision of the act creating the district. The damage complained of would not have accrued to a smaller vessel. It was the resistance of the current as augmented by the narrow draw and the great bulk of the vessel, the latter being such as to practically fill the draw and stop the flow beyond her bow. These three causes combined brought about the damage claimed. Was the additional current an unreasonable use of the permission given by the government? I think not. It was also a reasonable exercise of the power vested in the secretary of war. I find no adjudicated case dealing with the rights of navigators with reference to difficulties of navigation caused by increased speed of currents resulting from acts approved by the proper government officers.

In the case of *Cummings vs. Chicago*, 188 U. S. pp. 410 to 431, Justice Harlan lays down certain general principles affecting the relative powers of the United States and of the state with reference to navigable waters, which, while not bearing directly on the facts of this case, would seem to indicate that it was not the purpose of the act of 1890 to deprive the state within whose limits the navigable water is wholly situated of all reasonable control for local purposes.

On general principles, however, the rights of navigators must be held to be subject to the exercise of such power by the government. The most that can be said for libellant is that it has made out a case of *damnum absque injuria*. The libel is dismissed.

PLANS FOR DEVELOPING HARBOR.

Plans for the improvement of Cleveland harbor were discussed quite thoroughly at a meeting of the Chamber of Commerce, held in Cleveland on Tuesday evening. Addresses were made by Maj. Dan C. Kingman, government engineer, Hon. T. E. Burton, chairman of the committee on rivers and harbors of the house of representatives, and Mr. Harvey D. Goulder, who has for years taken an active interest in Cleveland's lake commerce. Maj. Kingman outlined in his paper plans providing for a new and extensive harbor with wharves from Erie street to Gordon park and entailing an expenditure of \$30,000,000. In his general definition of what a harbor should be Maj. Kingman said:

"A harbor ought to furnish a sheltered area of sufficient size for all vessels likely to take refuge in it. The depth of water should be sufficient to float the largest ship and not too great for convenient anchorage. The bottom should be of good holding ground and the shelter against waves should be complete. Entrances and exits should be convenient. But in law and commercial usages harbors should be more than this. They should have proper facilities for unloading vessels and proper wharf facilities, and the land approaches should be convenient. Trains should be able to run alongside the ships. A harbor without proper railway facilities is no better than without water in it."

Maj. Kingman believed that large commercial harbors must exist at Duluth, Chicago, Cleveland and Buffalo, as all four cities are located to feed an important territory. He reviewed the history of Cleveland harbor from 1825 to the present date and showed that while in 1874 Cleveland had 93 per cent. of the entrances and clearances in the Cleveland district and 96 per cent. of the tonnage, it had now only 52 per cent. of the entrances and clearances and 37 per cent. of the tonnage. He believed that inadequate facilities was the cause of this decline and that the real harbor of Cleveland had always been the river, extremely tortuous and difficult to navigate. Continuing he said:

"What is to be done? Congress has recently approved a plan for greatly enlarging and improving the entrance to the harbor of Cleveland, extending the breakwater to Gordon park. The work will cost \$4,500,000, and already an expenditure has been allowed that will suffice for a new entrance and for the construction of about 10,000 ft. of new breakwater. The work is now in progress. This will protect three miles of lake front. Will this suffice to restore the lost commerce? No. The general government is simply building a fence around your farm. It is for you to cultivate it with skill and diligence. If this great breakwater that we are building is permitted to stand there and serve no other purpose than to protect a length of shore from erosion, if railroad companies are allowed to acquire riparian rights and hold them for the purpose of excluding rivals, if individuals or syndicates get possession of this front and keep it for the sake of the unearned increment, then what I am doing out there is

worse than folly, it is a positive crime against the whole United States. It were better to take the millions collected and scatter them broadcast in the lake."

Maj. Kingman declared that Cleveland should secure an entirely new haven for its ships and that it were useless to attempt to develop either the west breakwater or the river. He believed that the natural harbor, owing to ease of approach, was from Erie street east. This would result in a shifting of business centers and a complete rearrangement of land approaches. Describing it he said:

"The breakwater will extend to Gordon park. It is 3,700 ft. from shore, with an entrance on the east and one opposite Erie street. It will afford a waterway 1,700 ft. wide. The first frontage, 700 ft., belongs to the United States government, being the marine hospital. This I have asked congress never to give up, as it will be the basis of the new harbor. Here the government can build two slips, each 150 ft. wide and 700 ft. deep, with wharves alongside. These wharves can be well constructed, with the upper part of massive concrete. Wharf room would be provided for a harbor custom house and a mooring place for a revenue cutter and for a lighthouse depot. These wharves of the United States government would be a model for the city to follow. To Gordon park there is a frontage of 17,250 ft. This should be secured for the benefit of the public. No actual land above water need be secured. The riparian rights secured, a series of wharves should be constructed. Each wharf might be 200 ft. wide, with slips between 150 ft. wide and 700 ft. deep. Forty-nine and one-half piers are provided for to furnish ninety-eight wharf fronts. No tugs would be required for ships to enter."

"Now as to the railway approaches. It is a great problem. I would advocate two four-track railroads passing through the city by means of tunnels, one at the foot of Alabama street and one at the foot of Willson avenue. As to the cost. The bulkhead along the inner end of the slips would cost \$140 per linear foot, or \$2,415,000. Between this bulkhead and the shore the space, 16,500,000 cu. yds., must be filled. Part of this fill will come from the excavation for the tunnels. The bulkhead and the filling would cost \$1,890,000. For the revetment for the wharves for 13 1-10 miles of water front would cost \$1,050,000, making the wharves cost \$12,700,000. This would require 100 miles of railroad track, costing \$900,000, and 6 miles of tunnel, costing \$12,000,000. In all, the cost would be \$30,490,000, or, in round numbers, \$30,500,000. A large sum, but the work need not all be done at once. And the 22,000,000 sq. ft. of made land should be worth a dollar a square foot, or produce an income of 5 per cent. on that basis. The wharves ought to be worth \$2 a square foot, or produce an income of 5 per cent. The property would be worth in all \$35,000,000, and produce a gross annual income of \$1,750,000. This would suffice for cost of maintenance. To do this work I should have a directorate formed of the mayor of the city, the city engineer, the government engineer, to represent the United States; the Lake Carriers' Association, if incorporated, and at least three representatives from the Chamber of Commerce. The first two members should serve ex-officio, and the others elected for stated periods, and, if Cleveland is to become as I think she should, the queen city of the lakes, this is not impossible. Cleveland has the opportunity, and she should make use of it."

Mr. Harvey D. Goulder gave a very clear exposition of the legal aspects of the case. He believed that the title to the land under the water, involved in the extension of piers, is in the state of Ohio. The doctrine of private ownership, which applies to rivers and waters lying wholly within the state, has not been extended to the waters of Lake Erie. But the shore proprietor has the right of wharfage-out, as it is called, that is, of building wharves and structures for purposes of navigation, out to the established dock line. It has been a mooted question whether this is a property right or a mere easement. It has been involved in some disputes about its taxability. And so arises a minor question, whether the right should be appropriated, and if so, whether there must be paid compensation as for actual property taken or whether it is merely a question of damages. He had no doubt, however, of the city's right to appropriate. Concerning the present ownership of the 18,000 ft. involved, he believed that some 5,300 ft. were owned by a railroad company, which is currently reported to be bound by a traffic arrangement which forbids its exchanging freight with vessels at Cleveland, and so has no interest in the water front except to use it as a right of way; part is owned by the city, part by the general government and part by individuals. For himself he did not think it so essential that the city should own the docks as that it should control them and see that they were properly operated.

Considerable of what Mr. Burton said in his address has already been published in the Review—that is, his observations on his recent trip abroad and the greater vision with which public improvements are approached there than here. Coming down to the method of assessing costs for these improvements, which is a vital point, Mr. Burton said:

"It would be impossible to portray to you any general system as to the way in which this expense is met. That was one object of the investigations which we were making in Europe, to see if it were possible to evolve from all the varied systems any method or way which would afford valuable suggestions for our own country. I tried to classify the different methods, and concluded that there were three."

"The first was that in which the central government improves the channel, or makes the improvement, and makes no charge whatever upon the commerce availing itself of the improvement."

That is the method in vogue in the United States, with limitations, and in France until this very year. The second method is that under which the central government makes the improvement, but imposes a toll or tax, something in the way of compensation for the improvement. That is the method which is in vogue in France and Germany with reference to harbors. The third method is that under which the making of these improvements is absolutely left by the central government to the communities interested. That is essentially the method adopted in England. The central government does not improve the harbors or channels, except when it is a matter of military or naval exigency, leaving that to the cities or to private companies which desire to promote the sale of some commodity.

"These are the three great general methods, but it should be borne in mind that there is a vital difference between the scope of the improvements in most of the countries of Europe and those in our own country, and this presents a question of the greatest importance. Our own country merely provides for the deepening of channels for the providing of a protecting waterway. That which belongs to the central government appears clearly here in the construction of the breakwater. To private parties of the city is left the construction of the wharves east and west, and the filling to be done here. In France not only would the general government construct this breakwater, but it would also construct these wharves and make this filling, imposing a considerable charge for the use of these wharves. In some instances the French government builds warehouses on the wharves, but leaves the construction of railway tracks to private parties or to the railways. There are many arguments in favor of a combination of all that work under one management. But it is not the system which has been adopted by the national government, and is not likely to be, and so I wish to impress upon the members of this chamber that this improvement is up to you and to the city of Cleveland. The general government has commenced it by the construction of that breakwater, for which, while provision has not been made for the whole structure, it has been made for work of at least six years. It now rests with the city of Cleveland to utilize the harbor created by the breakwater. My message to you is that I hope you will do it, and I hope you will begin promptly. Maj. Kingman has laid out before you an elaborate plan for this. It may seem exceedingly expensive. The expense would stagger those who desire earnings and look with conservatism upon such a problem, but I like to see people optimistic, and while it is not probable that any such sum as he has estimated for the cost of this improvement will be expended for many, many years, we all believe in the future of the city of Cleveland, and it is not necessary that these \$30,000,000 should be expended at once."

Mr. Burton then outlined his own views, which are for the extension of the breakwater to Gordon park and the development of the property which it protects.

LAUNCH OF PERE MARQUETTE NO. 19.

On Saturday last the car ferry Pere Marquette No. 19, building for the Pere Marquette Railway Co., was successfully launched at the Cleveland yard of the American Ship Building Co. Mrs. W. C. Mercereau of Ludington, Mich., wife of the superintendent of the Pere Marquette company, named the new steamer. Mr. Robert Logan, assistant general manager of the ship building company, designed the ferry and superintended its construction. The new steamer has no passenger accommodations whatever, but it is in all other respects a duplicate of car ferry Pere Marquette No. 17. The new steamer is 350 ft. over all, 338 ft. keel, 56 ft. beam and 36 ft. deep. She is equipped with two triple-expansion engines with cylinders of 19, 31 and 52 in. diameter and 36 in. stroke. Steam will be furnished by four Scotch boilers, 13 ft. 9 in. in diameter and 12 ft. long. The new car ferry has a capacity of thirty cars and is designed for a speed of 16 miles an hour. She will be operated between Ludington, Manitowoc and Milwaukee and will go into commission early in December.

Pere Marquette No. 20, which is also building in Cleveland, will be launched next month. She will receive her machinery at South Chicago and will be towed to that port by No. 19. With the addition of these two vessels the Pere Marquette Railway Co. will be operating five modern car ferries on Lake Michigan.

CANADIAN SHIPPING NOTES.

Abbey Bros., Owen Sound, Ont., have secured contracts for the construction of five small tugs for Georgian bay trade.

Davis & Co., Kingston, Ont., have secured an order to build for an English owner, who has a residence on Muskoka lakes, a 72-ft. steel yacht.

The hull of the tug Reliance, recently burned at Spanish River, Ont., has been raised and towed to Collingwood, where it will be rebuilt. The Midland Towing & Wrecking Co. are the owners.

James Dunsmuir of Victoria, B. C., is having plans prepared for a steamer for the coal trade on the Pacific coast and for a large car barge to operate on the ferry between Ladysmith and Vancouver, B. C.

The Dominion government proposes to expend a further sum of \$1,067,876 on improvements at Port Colborne, the Lake Erie end of the Welland canal. A breakwater and wharves are under construction, and elevators and an electric installation are contemplated.

The Hampstead Steam Ship Co. has been incorporated under the New Brunswick companies' act to carry on a general navigation business on the St. John river. The capital is \$24,000 and the offices are at Oak Point, N. B. H. E. Palmer, Oak Point, is one of the provisional directors. Another new New Brunswick concern is the Maritime Engineering Co., to be engaged in the manufacture of marine engines and to do ship building and repairing. The capital is \$30,000 and the officers are to be at Moncton, N. B. P. S. Archibald, C. E., Moncton, is interested.

AROUND THE GREAT LAKES.

A dispatch from St. Joseph, Mich., announces the completion of the work of extending the piers at that port.

Another regular quarterly dividend—1¾ per cent.—has just been paid to preferred stockholders of the American Ship Building Co.

The Polson Iron Works, Toronto, Ont., is to build a steel frame for an 80-ft. steamer intended for mission work among the Indians on Great Slave lake.

Another of the new Gilchrist steel steam freighters, the Henry S. Sill, was launched at the West Superior yard of the American Ship Building Co. on Saturday last. She is 436 ft. long, 50 ft. beam and 28 ft. deep.

The steamer Lloyd S. Porter, which it was feared had foundered in a recent storm on Lake Ontario, arrived safely a few days ago at Olcott beach. She had a hard time of it after breaking away from her two consorts.

The International Steamship Co., of which Mr. A. B. Wolvin is president, has surrendered its charter and will wind up its affairs. It has not been an active corporation for some time, the vessels owned by it having been sold to Atlantic coast parties.

The Steel Corporation steamer John B. Trevor took 120,000 bu. of wheat from Superior to Chicago this week. This is, indeed, like carrying coals to Newcastle. It was wanted for mixture with other wheat that might thus be brought up in grade.

While on her way from Chicago to Ashland for lumber, the steamer Kalkaska suffered a broken shaft and was towed to Cheboygan, where repairs will be made. She was passing through the Straits of Mackinac at the time and had no difficulty in securing aid.

Capt. Wm. Turgeon of the Chequamegon Bay Transportation Co., who has had considerable legal trouble in Cleveland over the purchase of the passenger steamer Skater, has settled differences with his competitor, F. R. Brown, by purchasing his (Brown's) interest in the vessel.

A steel light-ship, building for the Canadian government for use on the lower St. Lawrence, was launched Monday at the Polson Iron Works, Toronto. The vessel is 112 ft. long and 29 ft. beam. She will have lighting apparatus of the finest kind, as well as a powerful fog signal.

James M. Saunders has resigned command of the steamer Northern King to take a position as dock superintendent for the South Pacific Railway Co.'s Atlantic coast steamship lines at New Orleans. W. C. Farrington, formerly of the Northern Steamship Co., is manager of the line.

A few weeks ago the body of Capt. M. L. Gotham, who was lost with the steamer S. J. Macy a year ago, was found floating on Lake Erie, and now the body of his son, Lucien Gotham, who was also drowned with the Macy, has been recovered. The body of Lucien Gotham was found near Ashtabula on Thursday last.

The Racine Boat Manufacturing Co., Racine, Wis., launched last week the yacht Roxina, for Mr. John W. Gates. The yacht is 100 ft. long, 17 ft. wide and draws only 28 in. of water, has a flat bottom and is adapted especially for inland waters. The boat will start for Port Arthur, Tex., by way of the Illinois canal at once.

The steamboat company which has been operated by Capt. Walter L. Visger in the Thousand Islands has been incorporated with a capital stock of \$500,000. The incorporators are: Walter L. Visger, Carrie M. Visger and William E. Miller of Alexandria bay; Frederick T. Thompson of Syracuse, N. Y., and Sigmund Stern of New York.

Duluth to the Sault in twenty-eight hours is the run credited to the fine passenger steamer Tionesta of the Anchor Line. She was carrying 3,000 tons of freight while making this run. The steamer Cornell of the Steel Corporation fleet made the run from Sault Ste. Marie to Two Harbors, took on 7,100 tons of ore, and returned to Sault Ste. Marie in sixty-five hours.

Wisconsin Transit Co. is the name of the Ohio corporation organized a few days ago by Henry A. Hawgood and others of Cleveland for the operation of the steamer Wisconsin, a large freighter that is about ready for launching at the West Superior yard of the American Ship Building Co., as well as a similar steamer building at the Cleveland yard of the same company.

Naval Architect Wood of Chicago has forwarded plans and specifications to the various ship building concerns on the lakes asking bids for the construction of a new steamer for the Indian Transportation Co., the Michigan City Line. The steamer, which is to be of steel, must be completed by April 2, and it is expected that some trouble will be experienced in getting her out by that time. The craft will cost about \$100,000.

Engineers in the employ of the Pittsburg Steamship Co. a few days ago presented Mr. E. I. Jenkins, vice-president of the Marine Engineers' Beneficial association, with a beautiful watch charm. The charm is in the form of the emblem of the M. E. B.

A. It is studded with diamonds and beautifully made. The intention of the engineers is to show their appreciation of the services rendered there by Mr. Jenkins in settling differences with their employers.

The old passenger steamers Badger State and Empire State, which were operated between Cleveland and Detroit last year by Barry Bros., were sold at marshal's sale at Detroit last week. Mr. H. R. Haven of Detroit bought the Badger State for \$2,700 and Mr. F. H. Reibenack of Alpena the Empire State for \$1,550. It appears that Capt. James Davidson of Bay City desired to bid upon the steamers, but arrived a little too late. The purchasers have declared their intention of rebuilding the vessels, which they bought at very low figures, for the lumber trade. Machinery in either of the vessels is probably worth more than was paid for both of them.

The revenue cutter Tuscarora, lately arrived on the great lakes, has been transferred from Milwaukee to Cleveland temporarily to take part in the fishing dispute which has lately vexed the Canadian authorities and resulted in the firing upon and seizure of American fishing tugs. Of course this fishing treaty with Canada is not a one-sided affair. The United States has just as much interest in it as Canada has, and has just as pertinent an interest in prosecuting poachers. It will be the special province of the Tuscarora to see that vessels which encroach in Canadian waters and return with fish take out clearance papers. They are not permitted to bring foreign fish into the country without reporting to the customs officers. The boundary line is, of course, imaginary—that is, it is imaginary to most persons, but the masters of fishing tugs know precisely where it is. A part of the Tuscarora's duty will be to give to the line a local habitation and to mark it definitely by such measurements that it may not again be mistaken.

FOR THE ERIE CANAL.

Advocates of canal enlargement in New York state are feeling much encouraged over the gradually developing favorable sentiment in Chautauqua county, which has been considered one of the strong anti-canal counties of the state. This sentiment has been recently strengthened by the authorized statement of Justice John S. Lambert of New York, who is, however, a resident of the county.

"It is true," said Justice Lambert, "that I have not informed myself particularly as to the details of this proposition, but I know the men who are interested in the project, know the men who have made the engineering calculations and estimates, and I am prepared to accept their judgment as experts upon this question. Every intelligent man knows that it requires only about one-fifth of the energy to carry freight upon the water that it does by rail, and no matter what the jugglery of figures in freight rates may show due to fast freight lines and other devices, the fact remains that from an economic standpoint it costs the shipper much less to use the canals than to use the railroad. There is nothing to be gained by the state by a waste of energy and resources, no matter what may be the result to individuals, and when the great commercial interests of the state unite in demanding a 1,000-ton barge canal, I am bound to believe that they have investigated the matter and know more about it than the men who have devoted their time to tilling the soil and who have had no special opportunities to study this question."

Judge Lambert further discussed the fallacy of the ship-canal argument, showing very conclusively that there was little chance of securing a congressional appropriation, with the interests of other states involved, for a project of that character, which he believed would cost at least \$500,000,000. "We are face to face with the question," said he, "whether to permit the Erie canal to go to decay or to bring it up to modern requirements."

Elberon B. Crissey, president of the Farmers & Mechanics' Bank of Jamestown, and interested in a chain of country banks and several extensive agricultural enterprises in Chautauqua county, also favors canal improvement.

"You can say for me," said Mr. Crissey, "that I am for the construction of the barge canal. The past history of the state demonstrates that the canal is the basis of her material prosperity, and it is a fair conclusion that an enlargement of this waterway will be followed by the development of manufactures. It is an axiom that commerce seeks the cheapest route of transportation, it being the constant endeavor to carry the material from the producer to the consumer at the least possible cost. In furnishing such a cheap route lies the commercial supremacy of the Empire State. I have been interested in reading the grain report for August. It shows that 1,800,000 bu. were exported from Montreal, 2,800,000 bu. from Galveston, 831,000 bu. from New Orleans, and 637,000 bu. from New York. The predominance of the southern export stations demonstrates to my mind that there is a combination of railroads to forward traffic to those centres, and it is through this shuffle that New York is liable to sacrifice her commercial supremacy. With the natural advantages of the south, coupled with the action of the railroads, New York cannot remain the supreme factor in controlling this commerce unless the canal is adequately enlarged. It is a matter both of science and common knowledge that it is cheaper to transport bulky products on the deep waterways than by rail. Therefore by enlarging the canal and furnishing the cheapest route commerce will revert to this section. In addition to the grain trade, the Niagara frontier will be the cheapest place on earth to assemble, coal, ore, and steel products. Those interested in in-

dustrial enterprises will seek that frontier as the most profitable field for entering into competition with the iron and steel markets of the world. What will be the result? Enormous mills must be erected in that section. Skilled hands must be brought to work in those shops at high wages. In a word, it means the doubling of the population of Buffalo and the stimulation of industrial enterprise in the other cities on the canal.

"It is right here," continued Mr. Crissey, "that we of Chautauqua county are going to secure the benefits of this canal at the expense of the other fellows. It is very evident to me, from what I know of farming communities—and I can fairly claim to know something—that the prosperity of the agricultural interests of this state will be largely proportionate to the attention that is given to dairying. Now, if the farmers are going into dairying they must have markets. The larger the markets the greater the demand; the greater the demand the higher the prices. Therefore we farmers and business men of Chautauqua county should vote to construct this canal because it will contribute to the prosperity of the cities and increase the population principally at the expense of the taxpayers of the cities.

"I expect to see the day that will witness the development of three things—modern waterways, good roads leading from the farms to the great cities, and trolley lines running through rural regions, carrying fresh vegetables and the products of the dairy every day direct to the centres of population. This is to be one of the marvelous features of the economic development of this generation, and the canal from the Hudson to the great lakes is simply a part of the plan.

Mr. Crissey for a number of years was a member of the board of public works of the city of Jamestown, and consequently is thoroughly familiar with the details of the construction of public improvements. His views regarding the cost of the proposed barge canal are therefore timely.

"It has been said by canal opponents," said he, "that the work cannot be done within the appropriation. I do not agree with that contention. I would not care to be classed with those absurd people who declare offhand that the engineers making the estimates are wrong, and that the canal will cost in excess of the sum estimated. Engineers of national reputation have staked their professional prestige upon the statement that this waterway can be constructed for less than \$100,000,000. Indeed, I am of the opinion that the enlarged canal was planned by its friends while the appropriation was planned by its enemies. The latter have sought to make the amount so large that the people would not vote for it even when convinced that it was a sound project. But the people will build this canal."

SHIP BUILDING IN THE UNITED KINGDOM.

From the returns compiled by Lloyd's register of shipping it appears that, excluding warships, there were 393 vessels of 906,608 gross tons under construction in the United Kingdom at the close of the quarter ended June 30, 1903. Particulars of the vessels in question are as follows, similar details being given for the corresponding period in 1902 for the purpose of comparison.

| Description. | Sept. 30, 1903. | | Sept. 30, 1902. | |
|---------------------------|-----------------|----------------|-----------------|----------------|
| | No. | Gross tonnage. | No. | Gross tonnage. |
| Steam. | | | | |
| Steel | 353 | 889,035 | 356 | 977,455 |
| Iron | .. | | 1 | 170 |
| Wood and composite | 1 | 220 | 1 | 100 |
| Total | 354 | 889,255 | 358 | 977,725 |
| Sail. | | | | |
| Steel | 21 | 15,609 | 17 | 21,348 |
| Iron | .. | | .. | |
| Wood and composite | 18 | 1,744 | 13 | 1,641 |
| Total | 39 | 17,353 | 30 | 22,989 |
| Total steam and sail..... | 393 | 906,608 | 388 | 1,000,714 |

The present return shows a decrease in the tonnage under construction of about 122,000 tons as compared with the figures for last quarter, and a decrease of about 507,000 tons as compared with the total reached in September, 1901, which is the highest on record. Of the vessels under construction in the United Kingdom at the end of September, 309 of 678,389 tons are under the supervision of the surveyors of Lloyd's register with a view to classification by that society. In addition sixty-two vessels of 197,486 tons are building abroad with a view to classification. The total building at the present time under the supervision of Lloyd's register is thus 371 vessels of 875,975 tons.

The following details concerning the ship building work of the United Kingdom during the past three months may be added:

| During quarter ending Sept. 30, 1903. | Steam. | | Sail. | |
|---------------------------------------------------------------------------------|--------|----------------|-------|----------------|
| | No. | Gross tonnage. | No. | Gross tonnage. |
| Vessels commenced | 120 | 172,011 | 22 | 15,281 |
| Vessels previously commenced, but on which no further progress has been made .. | 11 | 64,221 | 4 | 352 |
| Vessels launched | 166 | 290,353 | 10 | 1,658 |

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POWER PLANT OF ST. LOUIS FAIR.

About 60,000 H. P., of which 53,000 H. P. will be used in Actual Functions of the Exhibition.

A great feature of the St. Louis world's fair, which now gives promise, more than ever, of overshadowing all previous shows, will be its power plant. It will be located on the main floor of machinery hall, involving more than 60,000 H. P., of which about 53,000 H. P. will be utilized in driving work or in performing actual functions of the exhibition. The prime movers comprising the power plant consist of the latest types of high-speed steam engines, gas engines and turbine engines, and the various elements assembled will come from points as far apart as San Francisco, Providence, Milwaukee and Birmingham in this country, as well as from England, France, Belgium, Sweden and Germany.

Plans for the power plant are now so far advanced that it is possible to state what the units are, and their location with reference to one another, and it may be said conservatively that this feature of the St. Louis exhibits will, in point of completeness, newness and excellence, excel anything of the kind ever seen at any exposition in this or in any other country. Lieut. Godfrey L. Carden of the United States revenue cutter service, superintendent of arsenal tools in the exposition department of machinery, has kindly assisted the Review in securing a description of the power equipment.

Among the foreign prime movers which have been accepted are the following: Willans & Robinson, Rugby, England, 1,000 H. P. high-speed steam engine; Greenwood & Batley, Leeds, England, 300 H. P. turbine engine; C. G. Norris, Manchester, England, 3,000 H. P. fuel gas producer for operating gas engines; Delaunay-Belleville, Saint Denis (Sur Seine), France, 1,500 H. P. complete unit, comprising a high-speed vertical triple-expansion engine, boilers and generators; J. & A. Niclausse, Paris, France, 1,000 H. P. marine tubular boilers; Durr & Co., Dusseldorf, Germany, 1,200 H. P. marine tubular boilers; Societe Alsacienne des Constructions et Mecaniques, Mulhouse, Germany, 1,000 H. P. steam engine and generator; A. Conti, 900 H. P. boilers; A. Borsig, Tegel, near Berlin, 1,750 H. P. gas engine; Julius Pintsch, Berlin, 2,400 H. P. fuel gas producer plant; Gasmotorenfabrik Deutz, Deutz, near Cologne, Germany, 900 H. P. gas engine; Societe Anonyme John Cockerill, Seraing, Belgium, 3,000 H. P. gas engine; De Laval Turbine Co., Stockholm, Sweden, 300 H. P. turbine.

Among the domestic manufacturers who will contribute are the following: Allis-Chalmers Co., one 5,000 H. P. reciprocating steam engine; General Electric Co., 3,000 K. W. turbine engine; Hoover, Owens & Rentsler Co., 2,500 H. P. vertical cross-compound engine, and a 1,500 H. P. steam turbine. The list of American-built steam and gas engines and steam turbines ranging in ratio from 200 to 1,000 H. P. is very long and interesting, and will later be made the occasion for extended description. An interesting topic will be a tangential water wheel from San Francisco, operated by water that is forced through a pipe and nozzle at the rate of 1,200 gallons per minute and under a pressure of 300 lbs. per square inch. A Jeanesville (Pa.) steam pump will be used to create the artificial head. This volume of water under the pressure noted will strike the buckets of the wheel, transmit its energy and fall as quietly as if poured from an ordinary basin.

About 100 ft. to the west of machinery hall will be found the steam, gas and fuels building, which covers an area of about 100,000 sq. ft., and is itself an example of the most modern fire-proof construction. In this building will be found great hoppers for storing the 4,000 tons reserve supply of coal and mechanical means for automatically conveying this coal from the cars to the bunkers and from the bunkers to the furnaces and gas plants. The daily consumption of coal will exceed 400 tons and the total length of the automatic conveyor lines will be about three-quarters of a mile. Here there will be found boilers to furnish steam and gas producers to supply the gas for the operation of the engines in machinery hall. Briquette making, various types of mechanical stokers, forced draft apparatus, water purifiers, and exhibits of items directly germane to the subject of steam generation and control will be installed in this building.

The intermural railway will be operated by five items of the machinery hall power plant, and it is interesting to note that the intermural railway consists of a double-track trolley road, seven miles long, standard gauge and standard type of open cars. The motor equipment and control is furnished by the General Electric Co. The brake equipment and control is furnished as an exhibit by the National Electric Co. The power plant for the operation of the road will be located in the central portion of machinery hall and the prime movers in this plant are as follows:

(1) A 1,750 B. horse power Oechelhauser system gas engine, 100 revolutions per minute, built and exhibited by A. Borsig, Tegel-Berlin, and supplied with gas from a producer plant built and exhibited by Julius Pintsch of Berlin.

(2) A 900 H. P. Corliss type steam engine, eighty-five revolutions per minute, built and exhibited by Lane & Bodley of Cincinnati.

(3) A 750 H. P. modified Corliss steam engine, 100 revolutions per minute, built and exhibited by Murray Iron Works, Burlington, Iowa.

(4) A 600 H. P. four-valve steam engine, 150 revolutions per minute, built and exhibited by the Harrisburg Foundry & Machine Works, Harrisburg, Pa.

The Crocker-Wheeler Co. of Ampere, N. J., built the gen-

erators, which in every instance are directly coupled to the prime movers and deliver current at 550 volts at the switchboard.

In connection with the waterways it is interesting to note that the main one consists of a grand basin with lateral lagoons. The water is delivered into this basin from a niche in front of festival hall and from fountains in front of two ornate restaurant buildings which flank the terrace of states. From these three points it flows over cascades and it is to be illuminated by electric lights placed under the lip of each step which breaks the spill. The water is to be lifted by three centrifugal pumps, built and exhibited by the Henry R. Worthington Co. Each pump is planned to deliver 30,000 gallons of water per minute against a total head and suck of 158 ft. Three induction type motors, each of 2,000 H. P. rating, are to operate the pumps. The magnitude of this feature will be better appreciated by those who recall that the total water moved at the Paris exposition of 1900 was about 4,500 gallons per minute and at the Buffalo exposition of 1901 about 7,000 gallons per minute, while in the St. Louis cascade feature alone 90,000 gallons per minute are moved. The energy required for the operation of this feature equals the total energy had from the Niagara power plant by the Pan-American exposition and the total energy availed of for illuminating the entire Buffalo exposition. The secondary water system consists of Arrow Head lake. This lake is to afford an opportunity to illustrate the water dwellings and water life of the Philippines.

Incidentally, it may be of interest to note that some \$600,000 are to be expended on the Philippine exhibit, and the result will no doubt be both entertaining and extremely instructive.

TALKING SENSE ABOUT BELLEVILLE BOILERS.

Concerning recent experiences with Belleville boilers in the British navy, an expert writes as follows in one of the technical journals of Great Britain:

"At last even civilian experts in matters naval, a class of gentlemen who afford not a little innocent amusement to naval officers, are beginning to talk sense about Belleville boilers, the simple reason being that the achievements of ships fitted with these boilers during the recent maneuvers, and, in particular, the wonderful performance of the Spartiate, before and during the same maneuvers, have forced them to recognize where truth lies. But really these manifestations of the capacity of the Belleville boilers, under proper treatment, are no new thing. The fact is, that in the case of Belleville boilers everything depends not only upon the capacity, but also upon the disposition, of the engineer officers. The boilers are troublesome, they need a great deal of attention, they call for far more work below, and for more men to do it, than cylindrical boilers do; but they succeed with the engineer officer who makes up his mind that they shall succeed, and they fail under the officer who has a prejudice against them. In fact, there is no doubt that some kind of tube boiler, enabling steam to be raised more rapidly than is possible in a cylindrical boiler, is indispensable to ships of war. Possibly the forthcoming trials may show some other tube boiler, Babcock & Wilcox or Yarrow, to be better than Bellevilles, but Bellevilles will certainly not need to be discarded before they are worn out. Some credit, it may be added, is due to the admiralty for disregarding the journalistic attack on the Bellevilles, for it was severe. But the mischief of journalistic criticism in matters of this kind is that the paper which has once started a cry apparently must needs carry it on for ever, without regard to inconvenient facts."

SHIPS, OUR GREATEST NEED.

Is it not humiliating and costly that the United States foreign trade, for want of a sufficient ocean marine, is held in the clutches of British interests, as shown in the following extract from a recent (October 2) article in the London Weekly Times:

"The total tonnage entered and cleared at foreign ports under the British flag is now 106,000,000 tons in a year. The total tonnage under foreign flags entered and cleared at British and colonial ports is now 48,600,000 tons. Tonnage dues could therefore be levied on twice as much British shipping as we could levy on foreign shipping. But—and here we have a pre-eminent advantage, which, at a pinch, would, I venture to think, give us the victory in a battle of tonnage dues—we could kill foreign shipping at our ports, while foreign governments could not for a long time to come kill British shipping at their ports. Why? Simply because we could do all our overseas carrying without the aid of foreign ships, and foreign countries could not do all their overseas carrying without the aid of our ships. And so it follows that, until foreign countries have built up mercantile fleets sufficient for all their needs, the necessities of their overseas trades and their desire for cheap freights must compel them to send goods in British bottoms."

When will the United States be able to say: "We can do all our overseas trading without the aid of foreign ships?" Never, unless congress wakes up to the emergent deficiency.

It was William McKinley who said: "American shipping under the American flag should be found on all oceans, and our trade must go where our flag goes."

WALTER J. BALLARD.

Schenectady, N. Y., Oct. 21, 1903.

The Atlantic Works Incorporated of Philadelphia a few days ago received from Wm. G. Abbott an order for one of their 30-in. endless-bed single surfacer and joiner to be used in his ship yard at Milford, Del.

SEEN AND HEARD ON THE LOOKOUT.

It is more than 150 years ago that the double lights on Lizard point, now to ocean travelers so familiar, were first shown from this headland of the English coast. Great changes have taken place in all those years, but the Lizards, as mariners are wont to familiarly refer to this so-important beacon, have done business at the old stand, not only as regards the type of vessels passing incessantly within view of their warning rays, but also as to the size of the vessels, their speed, and, last but not least, their manner of propulsion. While to the passenger traveling to Europe these twin beacons are only interesting from the fact of their being the first object seen of an older world, and though, when homeward bound, this same passenger may linger upon the deck for a look at them only because it is the last to be seen of England, to the ship's captain it is a reminder of the outlying dangers of Lizard point, and a warning to keep clear of the dreaded "Manacles." An important change has now been made in the great improvement in the flashlight, but henceforth only one electric light will be shown. This light exhibits a flash every five seconds, and the concentrated intensity of each consecutive flash is such that the new Lizard light can lay claim to the distinction of being more powerful than that of any other lighthouse in the world.

While the struggle for supremacy between reciprocating and turbine engines is engaging the earnest attention of steamship owners, and at a time when the contestant proving the most economical in the expensive matter of coal consumption is expected to receive the victor's spoils, it may be interesting to hear of an ocean trip from Tacoma, Wash., to Delaware breakwater. The distance between these places—per sea route—is about 14,000 miles, and the steamship Texan, belonging to the American-Hawaiian Steamship Co. of New York, has left Tacoma with the intention of steaming the entire distance without making port to replenish her supply of fuel. Usually vessels traveling this route make stops at Coronel and Montevideo for coal, but as the Texan carries 4,100 tons of this commodity her engines may only cease from throbbing during one night should the Straits of Magellan be reached after dark, in which case anchor must be dropped until daylight makes possible a safe passage through this unbeaconed southern waterway. It will take the Texan about fifty days to make this trip, if true, as her New York agents claim, that she averages 276 miles daily. The Texan carries reciprocating engines, and as her average daily coal consumption will soon be known it would be interesting to have a turbine-equipped vessel start on a similar continuous voyage to enable us to compare the performances of the two craft. A friend of mine, an agent for a gasoline motor company, gives it as his opinion that both turbine and reciprocating engines are doomed, and that at an early date huge gasoline engines installed in ocean steamers will obviate the need of coaling stations, while each steamer having on board a few thousand gallons of gasoline can make a trip around the globe without calling at any port for a renewal of her fuel supply.

According to the ruling of a judge in the United States district court, the exemption of the seafaring man's wages from garnishment springs out of the sharp necessity which the nature of his calling creates when he leaves his ship. And this is certainly as it should be. Being compelled to allow his wages to accumulate in the hands of a stranger, as he cannot be paid day by day, the seaman, when the voyage ends, is urgently in need of money to provide himself with shelter and food during his temporary sojourn on terra firma. For this reason the law declares that the seaman cannot be deprived of his right to demand his wages when leaving his ship. This was recently illustrated when a dentist, to whom a ship's steward owed a small sum for professional services, trusted the latter's wages to the amount of \$19. Upon the steward's request the sailors' branch of the Legal Aid Society libelled the steamer—a vessel worth half a million or so—to secure the wages that were unlawfully attached. Dentistry not being in my line it would be presumption on my part to comment on the price charged by this doctor, but from this and similar cases that have lately been reported, those who are interested in the welfare of seamen have proof conclusive that the Legal Aid Society does its allotted work nobly and to some purpose.

With the advent of fall weather and its tempests, the bare poles of the yachts and other summer craft are now very much in evidence, but the tow barges of the Atlantic coast are still doing business, regardless of the howling gales that are expected at this time of year. "Ship on a tow barge" is the invariable answer of seafaring men to inquiry as to the most dangerous berth one could engage in the season of snowstorms—and yet they ship on them. Though these tow barges are now built especially for the trade they follow, most of them were originally old-time sailing ships. After having been shorn of their crown of glory—the lofty masts—they had short sticks substituted that cannot carry enough canvas to enable the vessel to be handled unaided. Seeing these barges I am ever reminded of an advertisement of cotton thread where an anchor, upon the flukes of which twins are seated, is suspended from the moon by a thread, and under it:

"Twin brothers we, as you may see,
Our lives hang by a thread, etc."

The lives of those going down to the sea in barges may truthfully be said to hang by threads, the breaking of the towline

converting these craft into unmanageable derelicts. In this connection it is interesting to hear (but probably there is no truth in it) that several towing companies have decided to equip their boats with a wireless telegraph system on account of the numerous instances during the past winter of the breaking away of barges from their tows, and it is hoped that by this means the location of helplessly drifting barges may be given to those in a position to aid their crews.

CHAMBERLAIN TO SHIP BUILDERS.

Mr. Chamberlain before the Greenock Chamber of Commerce the other evening made a brief speech in which he dwelt upon the shipping question. He said that any man would be presumptuous who would attempt to make a final tariff. No man could know as much about business as to know all businesses and it is only by expert advice that any scientific tariff, that is to say a tariff constructed not merely for revenue purposes but in order to benefit as large a proportion of the population as possible, could be constructed. Nothing is more dangerous than to attempt to separate the interest of different classes, whether in trade or industry. The interest of one is the interest of all. All must gain or none would gain in the long run. No policy was worth consideration for a moment which had for its professed object to benefit one class at the expense of any of the others. He continued:

"I suppose that is absolutely true in regard to considerations I have desired to put before you in reference to our fiscal policy. There is no advantage which I claim that policy will give to our manufacturing industries which it will not equally give to shipping and ship building. I know it is to the interest of ship owners to carry goods, and that it does not matter to them whether they are of foreign or home or colonial production, when they have a large foreign trade, and that any change may tend to put it at risk. Don't believe that. It is not true. I quite agree that the prosperity of shipping depends upon having a large transport trade. That is the A B C. But don't you all know that our foreign competitors are increasing their shipping, increasing it actually in amount by a greater tonnage than we are ourselves increasing our fleet, and that, therefore, in no long time they will do their own transport. Then, do you know that during all this time the colonial trade is increasing, and that your interest lies in developing the colonial trade rather than in developing the foreign trade? The object of my policy—I believe the result of the policy will be to increase the trade between this country and foreign countries by introducing a more reasonable and more equitable arrangement; but, if it has a contrary effect, still I would say to you, you ship builders and ship owners will have full compensation in the intercourse that it certainly will give to our colonial relations. Well, I don't blame—on the contrary, I applaud—every ship owner who brings to this country the profit of a new transport of foods, whether they be of foreign or whether they be of home production. I think it is perfectly right, and even patriotic, in inducing the carriage of foreign goods in British bottoms. So, again, with ship building, one of the greatest and most important of our industries. I do not blame the ship builders for building ships for foreign countries; but how long do you think under the present circumstances that trade will continue? Do you think the energetic American, the scientific German, who for the moment finds it convenient to buy his ships here will allow that to continue? Is not his policy to shut us out in one industry after another? Because your industry happens not to have suffered up to the present time, is there any reason why it will not suffer in the future? And if you encourage the Germans to dump their surplus goods in this country, to maintain a large output by that means, and so to cheapen the cost of their production on the ground that temporarily you will benefit when you get rather cheaper iron—2 shillings or 3 shillings, or it may be 5 shillings or 10 shillings a ton cheaper than you could otherwise get it—if you act upon that short-sighted policy you will find that the Germans, who can make iron cheaper than you, are precisely the people who can build ships cheaper than you. You stand aside and allow the iron industry to be ruined, and there won't be any iron industry to support you when in turn you are the object of attack. That, therefore, is my point. Together no class will suffer. Separate and allow different classes of industry to be destroyed in detail, then, indeed, I think we shall meet with a deserved fate."

Judge Andrew Kirkpatrick of the United States district court signed at Newark on Saturday last an order permitting Receiver James Smith, Jr., of the United States Ship Building Co. to open the Crescent Ship Yard at Elizabethport, N. J., for the completion of the Mexican cruisers Vera Cruz and Tampico, with money to be furnished by the Mexican government. He also appointed Mr. Smith receiver of the Crescent Ship Yard Co. upon application of the Long Arm System Co. of Cleveland. This places the ship yard company as an entity separate from the United States Ship Building Co.

During the present week two warships are to undergo their trials—the Missouri, built by the Newport News Ship Building & Dry Dock Co., Newport News, Va., and the cruiser Denver, built by the Neafie & Levy Ship & Engine Building Co., Philadelphia. The Missouri is a sister of the Maine, built at Cramps, and the Denver is a sister of the Cleveland, built at the Bath Iron Works, Bath, Me.

NEW FEATURES IN THE ALLEN PNEUMATIC RIVETER.

In Fig. 1 is illustrated a 55-in. riveter with a 12-in. cylinder made by John F. Allen, 370-372 Gerard avenue, New York city, which embodies in its construction several features recently patented. The piston rod connects levers of different lengths, forming a toggle joint. The lower ends of the larger levers are attached to fixed centers on the frame and the end of the short central lever is attached to the ram, which has a die-head screwed into the lower end. This latter arrangement permits of any desired change being easily made in the distance between the dies.

The most important among the improvements is an automatic cut-off arrangement which forces the valve back over the port opening and prevents the air from entering the cylinder when the machine is not in actual operation. This device is shown in Fig. 2 at D. Without this contrivance the port would be left open to the cylinder and the air would escape past the piston and out through the exhaust, resulting in a constant waste of air. As arranged, the full air pressure is maintained in the valve chest, and as the pressure is on the upper part of the valve the latter is kept down on the seat, preventing air passing through the cylinder ports and avoiding the necessity of shutting off air from

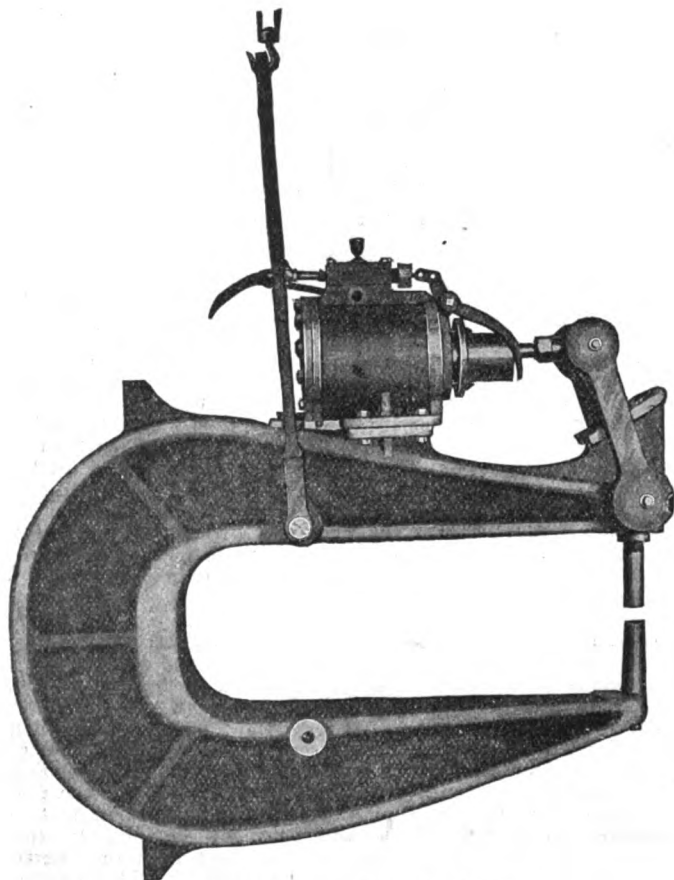


Fig. 1. 55-in. Allen Pneumatic Riveter.

the receiver in order to prevent waste. In reversing the valve the spring movement also prevents the sudden stop and consequent jar to the parts, a natural result when the valve is moved under pressure and then striking against the end of the valve chest.

The economy effected in air consumption is claimed to be full 25 per cent. over the old attachment on this make of machines, and many companies having tools, purchased before its adoption, have had the new device applied.

In Fig. 2 A indicates a small groove which runs from the port to the cylinder head and allows air to get behind the piston, as the port is covered by the edge of the latter and ensures the piston starting promptly and gently on the forward stroke. B is a similar groove at the front end of the cylinder and has a similar effect on the piston when returning on the backward stroke. These grooves also retard the escape of air and create a cushion at each end of the cylinder, and in this manner the motion of the piston is retarded and finally arrested. The improved construction takes the place of lugs on the frame at the point C, which on the earlier machines stopped the side link and arrested the movement of the piston at the end of the forward stroke. The sudden striking of the links against the lugs caused a jarring and severe strain on the working parts, which the modern construction entirely avoids. The spring actuated push pin D forces back the valve promptly as soon as the opposing pressure is released.

The middle link is connected with the piston rod by means of a steel crosshead, on the end of which is fitted a phosphor bronze shoe. The side links, which fit over the trunnions on the middle link, are connected by a straight pin. In this way a double bearing is obtained and a direct leverage effected of a unique type in riveter design. Tests have determined that a 12-in. cylinder of this construction with 80 lbs. pressure will exert 75 tons

pressure on the head of the rivet, and the tool is found very useful in the exacting service, for instance, of mud ring work on locomotives.

The double joint is illustrated in Fig. 2 at E, and the middle link and crosshead can be easily taken out by the simple operation

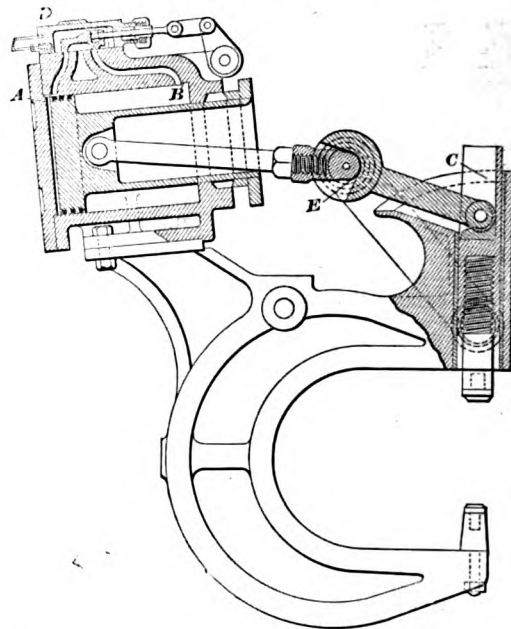


Fig. 2. Sectional View, Allen Pneumatic Riveter.

of removing the nut on the end of the pin. A special feature of the middle link is that it not only has a double bearing by working on the center pin and the phosphor bronze shoe, but the lost motion can be readily taken up by the substitution of a new shoe or by shimming up the old one, which small parts protect the more expensive one from any wear whatever.

It might be mentioned that prior to 1883 such a machine as a riveter was not in existence. It was then that Mr. Allen applied for the first patents in this line, since which time the energies of this firm have continually been devoted to this study. The evolutions are very pronounced and the present machine represents perfections beyond which it is difficult to conceive.

UNITED STATES SHIP BUILDING CO.

One of the points which has not yet been brought out in the investigation into the affairs of the United States Ship Building Co. is the amount which each of the owners of the subsidiary companies received for their plants. There has been a steady evasion of this issue. Mr. Nixon in his testimony on Wednesday of this week said that secrecy was observed in paying the vendors because John W. Young, the promoter, did not want them to know what was being paid for each plant. It appears that during the negotiations for the purchase of the constituent plants no one especially looked after the ship building companies, but that the figures and reports of the promoter were accepted. Mr. Nixon said that no independent appraisal or investigation had been made and disclaimed all personal responsibility for the negotiation and financial part of the combination plan. As an indication, however, of what was paid for the subsidiary plants the testimony of Mr. Charles Canda of the Canda Manufacturing Co., Carteret, N. J., is quite illuminating. This concern manufactures car wheels and has latterly done some experimental work in motor carriages. It is not clear what work it could precisely do for a ship yard and Mr. Canda admitted that it was not earning dividends. Yet \$1,000,000 was paid for it, \$900,000 in securities and \$200,000 in cash. Mr. Charles M. Schwab will later be called as a witness.

ARMOR PLATE BIDS HELD UP.

Representatives of the Carnegie and Bethlehem Steel companies held a conference this week with Secretary Moody of the navy department concerning the bids for armor plate recently opened. They endeavored to show Mr. Moody that the Midvale Steel Co., which was the lowest bidder, had no right to use the Krupp process of steel hardening, which is the most satisfactory of all processes of hardening steel. They did not say that they would not be satisfied if any part of the work was given to the Midvale company, but they intimated that litigation might result if the Midvale company undertook to harden the steel by the Krupp process. They also represented that they had recently extended their armor-making plants greatly and were prepared to deliver the entire amount required within fourteen months, whereas the Midvale company did not propose to deliver a pound within twenty months. The sum of \$7,000,000 is involved in the contract and Mr. Moody is somewhat perplexed as to what he had better do. The Midvale company is one of large capital and high standing and is ready to guarantee that it can satisfactorily make and deliver armor plate. Secretary Moody will render his decision within a week.

SCHERZER BRIDGES IN EUROPE.

Mr. Albert H. Scherzer, president of the Scherzer Rolling Lift Bridge Co., Chicago, returned this week from an extended business trip abroad. He visited the representatives of the Scherzer company in Russia, Germany, Denmark, Holland, Belgium, France and Great Britain, and found conditions in these countries very favorable for the introduction and use of Scherzer rolling lift bridges. The contracts secured as well as negotiations pending for additional bridges indicate that the use of this type of bridge will be as extensive abroad as it is in the United States. The Scherzer bridge under construction for the South Eastern & Chatham Railway Co., of which Sir Benjamin Baker is consulting engineer, is rapidly nearing completion. It is expected the new bridge will be in service within a few months. Rapid progress is also being made upon the Scherzer bridge across the Suir river, Ireland, for the Fishguard & Rosslare Railway Co.

ITEMS OF GENERAL INTEREST.

Contract has been given to the Puget Sound Bridge & Dredge Co. for a large amount of dredging at the Puget Sound navy yard. The sum involved is \$80,000.

Capt. Leutze, commanding the Maine, has cabled to the secretary of the navy from San Juan that the Maine made the run from Currituck, off the Virginian coast, to Cape San Juan light in 79 hours, an average speed of 15 knots. He added that the speed for fifty consecutive hours was 16.7 knots.

The United States torpedo boat destroyer Stringham has gone into dry dock at Baltimore to be fitted with two new manganese propellers, one of which will replace the one that threw off a couple of blades during the recent tests of the Stringham on Chesapeake bay. She will be ready for her trial in about a week.

A block of \$26,000 United States Steel first-mortgage 5 per cent. bonds was sold in New York last week for 100 and 100¹/₄. These bonds sold at 112 when the corporation was first formed. Three series of them are redeemable at 115 after 1910. They are mainly held by Andrew Carnegie, who took them in payment for his interest in the Carnegie Steel Co.

It is mentioned elsewhere in this issue that the battleship Missouri is to undergo her trial trip this week. Advices have now been received that she has made an average speed of 18.05 knots per hour over a course of 33 nautical miles and return. With tidal correction it is believed the speed will be advanced to 18.22 knots. The contract speed is 18 knots.

Speyer & Co. have consented to a sixty-day extension of their loan to the Lake Superior Consolidated Co., provided that all the

officials and directors of the company and all the sub-companies resign and Speyer & Co. are given absolute possession in all respects of all the properties. This is now being arranged and the Philadelphia and London committees will then undertake the work of reorganization.

Rear Admiral Royal B. Bradford resigned this week as chief of the navy bureau of equipment. The resignation is voluntary, as he desires to go to sea. He has been assigned to command the battleship Illinois and surrenders the title of rear-admiral to assume that of captain. In point of fact the chiefs of these bureaus value their rank as captain more than they do the title of rear-admiral by courtesy.

The Richelieu & Ontario Navigation Co. has declared its usual 3 per cent. half-yearly dividend. The stranding of the steamer Carolina in the lower St. Lawrence meant a loss of about \$30,000, and although there was \$400,000 insurance on the new steamer Montreal, the burning of that vessel involved a loss of business. But there was an increase in the business of the company's fleet as a whole, which permits of the usual dividend being paid.

Congressman Dayton of West Virginia, ranking member of the committee on naval affairs, is back from Europe with lurid impressions. He fancies that he perceives an intention on the part of Germany to seize South America and to establish a colonial empire there. Germany will be aided in this design by the superior navy she is now building. In 1910 she will have thirty-eight modern battleships. Mr. Dayton wants congress to authorize the construction of five battleships at its forthcoming session.

Capt. C. F. Shoemaker, chief of the revenue cutter service, will, in his forthcoming report to congress, ask for several new vessels. He will recommend the building of a new vessel for the sounds of North Carolina to replace the Boutwell; a vessel to replace at Key West the McLane, which has been ordered sold; a vessel for Puget Sound, to take the place of the Grant, and also a ship for service in the Sandwich islands with headquarters at Honolulu. He desires also extensive repairs made to the Thetis, Bear and Galveston.

The Standard Roller Bearing Co. of Philadelphia has purchased the entire ball business of the Grant Tool Co., Franklin, Pa. (formerly of Cleveland). In order to supply the demand at once for the well-known Grant balls, the business will be run for a short time in Franklin, but the works will eventually be moved to Philadelphia and consolidated with the Standard Roller Bearing Co.'s plant in that city. R. H. Grant, formerly manager of the Grant Ball Co., will have charge of the ball-making plant in Philadelphia, and a number of the former employes of the Grant company will remove from Franklin to Philadelphia and enter the employ of the Standard Roller Bearing Co.

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (SEPTEMBER, 1903)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

| | | | | | | | | | |
|-------------------------------------------------------------|---|---|---|---|---|---|---|---|---------------|
| French Navy | - | - | - | - | - | - | - | - | 355,560 H. P. |
| English Royal Navy | - | - | - | - | - | - | - | - | 929,300 " |
| Russian Imperial Navy | - | - | - | - | - | - | - | - | 227,500 " |
| Japanese Imperial Navy | - | - | - | - | - | - | - | - | 122,700 " |
| Austrian Imperial Navy | - | - | - | - | - | - | - | - | 56,700 " |
| Italian Royal Navy | - | - | - | - | - | - | - | - | 13,500 " |
| Chilian Navy | - | - | - | - | - | - | - | - | 26,500 " |
| Argentine Navy | - | - | - | - | - | - | - | - | 13,000 " |
| The "Messageries Maritimes" Company | - | - | - | - | - | - | - | - | 87,600 " |
| Chemins de fer de l'Ouest: (The French Western Railway Co.) | - | - | - | - | - | - | - | - | Steamships |
| plying between Dieppe and Newhaven | - | - | - | - | - | - | - | - | 18,500 " |
| Total Horse Power of Boilers in Use | - | - | - | - | - | - | - | - | 1,850,860 |

Société Anonyme des Etablissements Delaunay Belleville

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Works and Dock Yards of the Ermitage at Saint-Denis (Seine), France. Telegraphic Address: Belleville, Saint-Denis Sur-Seine

BROKEN STAYBOLTS.

The September number of the Railway & Locomotive Journal contained an article on "Plugging Tell-Tale Holes in Staybolts." Mr. John Livingstone, mechanical engineer of Montreal, endorses the article and in the October number of the same journal has a communication along similar lines. He says:

"Your article is timely. I have observed as many broken staybolts as you say taken from locomotives. Yes, drilled holes are not always in the center; they weaken the bolt and fill up with grease and dirt, preventing warning, and often breaking where the drilling stops. Plugging the holes is reckless of consequences. Life and property is at stake, and those who hide defects by plugging the holes should be held responsible, for those who do such things know that they are inflicting risks of disaster on the unsuspecting. Broken staybolts, like a disease which has become epidemic, are very prevalent now—more so than usual, if one may judge from the discussion of the Master Steam Boiler Makers' Association at their recent convention, where they diagnosed and imagined many causes, but proposed no definite cures. Their diagnosing and prescribing were indeterminate, with a tendency to empirical theories.

"Yes, 'when the inevitable explosion happens, men will hold up their hands and say that the cause of the accident was a mystery.' Just like a coroner's inquest, when a train runs down a precipice. Why? Experts are called before the jury to tell why. The experts decide as they have often done, that it was because of 'spreading of the rails.' Why should the rails spread? The experts may answer: 'Because they find the iron in the spikes or bolts crystallized and the momentum of the train would break them.' What would cause the iron to crystallize? The experts might answer that it might have been crystallized in the manufacture before it was made into bolts or spikes; or that it might have been caused by burning; or by unequal expansion and contraction.

"True, 'with hollow bolts plugging would be out of the question,' and with hollow bolts the expansion and contraction would be reduced to the minimum, for with air flowing through them their maximum temperature would not be much, if any, more than the temperature of the water or steam in the water space; they could not be burned, nor could their molecular structure be affected by the expansion or contraction of the sheet against them, for the air in the center of the bolts relieves the pressure on the walls of the hollow bolts. Air and water are effective protectors of the bolt from burning; the hollow staybolts enjoy both, the solid has only the water; and where it passes through the inside sheet, the solid staybolt and the sheet are least protected. What, may be asked, is the effect of burning? The answer may be given specifically from a technical journal with respect to tests. A plate of steel showed when tested results as follows: Tensile strength, 50,350 lbs.; elongation, 31.5 per cent. After service in the fire box a strip of the same plate was cut out and tested with results as follows: Tensile strength, 30,720 lbs.; elongation, 5 per cent. It was found to be burnt and the fracture showed crystallization.

"Much of the staybolt trouble of today," says a writer in Motive Power, 'can be traced to the fire, as those who are familiar with the fatal blue heat are aware of the fact that when the staybolts at one end are heated the fatal blue heat must appear somewhere in the total lengths of the bolts, hence very little expansion is necessary to break such a bolt.'

"This alleged cause of breakage, which may be charged to solid staybolts, has no place in the service of the hollow staybolts, because the air passing through them, and the temperature of the

water, or steam in the water spaces, are absolute preventatives to the burning of the hollow staybolts; nor can expansion and contraction, in the same degree as with solid, tend by vibrations from such action to crystallize the hollow staybolts. This is not a mere theory. It is founded on demonstration. In a report from a railway upon a boiler in which hollow staybolts were continuously in service for over six years there is nothing said about burning, nor about crystallization. With the quality of the hollow staybolt what it always should be, it will endure more and outlast any solid staybolt ever made."

The Engineer Publishing Co. announces the removal of the Engineer and Steam Engineering from Cleveland to Chicago "for the reason that its circulation has grown so large that only the latest and most modern printing and binding machinery can handle it and produce a first-class publication." This announcement is made in dull blue ink upon cream colored stock with a border of brown, and so folded as to make eight pages, though there is printing only on two of them. The whole is sealed with a bright red seal with edges properly pinked. The effect is, indeed, majestic and the imprint of Chicago upon it seems entirely superfluous. No printing and binding machinery could be obtained in Cleveland sufficiently late for such a supreme effort. Cleveland printers are an antiquated lot and such a marvel of the mechanical world as will run sixteen pages at a time on a sheet 44 by 58 in. is to them the tenth wonder of the world. Once an office boy in Cleveland was asked to get his employer a drink of water, and he presently came back and said: "There ain't no more water."

A 60-ft. gasoline launch, the Standard, built by the Marine Construction & Dry Dock Co., Mariner's Harbor, Staten Island, for Lewis Nixon, has a Riotte engine of 110 H. P. that makes 420 revolutions per minute. The propeller is 36 in. in diameter and has 6 ft. 6 in. pitch. The actual time made by this vessel, which was so greatly exaggerated in the newspapers, was 13 miles in 34 minutes.

Imports into Japan from the United States for the first time exceed those from the United Kingdom. In the six months ending with June, 1903, the imports into Japan from the United States were 24,950,493 yen, against 23,803,656 from the United Kingdom.

For Sale—A Bargain.

Two Brown Hoisting Machinery Company, all iron and steel, post jib cranes.

One 15-ton capacity 35 ft. 3 in. radius of hook, 18 ft. 6 in. lift.

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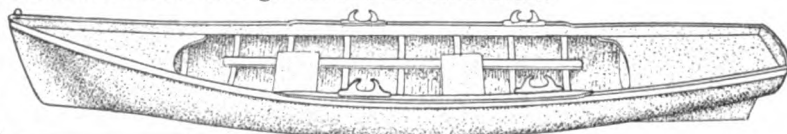
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TRADE NOTES.

The Great Lakes Engineering Works, Detroit, report a very satisfactory line of orders for their improved "semi-steel" propeller wheels. Among recent orders are: Two for the car ferry Shenango No. 2; one each for the Homer Warren, the Atlantic coast sea-going dredge Atlantic, the American Eagle, Byron Whitaker, Ida E., tug Alpha, V. H. Ketcham and tug C. L. Boynton. Business in propellers as well as in other lines at these works has shown a marked and continuous monthly increase.

The regular annual meeting of the stockholders of the Roberts Safety Water-Tube Boiler Co., one of the most prosperous of the American concerns that make water-tube boilers for marine purposes, will be held Monday, Nov. 2, at the office of the company in Redbank, N. J.

The steam power plant of the St. Louis exposition, now being built by Messrs. Westinghouse, Church, Kerr & Co., will be fitted with two large central condensing units, each consisting of a 40-in. elevated condenser capable of handling 96,000 lbs. of steam per hour. These condensers are being built by Henry R. Worthington of New York city, who will supply centrifugal pumps for handling the circulating water. That company will also furnish the rotative dry vacuum pumps which will remove all air from the condenser system. The boiler feed pumps of this immense power plant are likewise of Worthington make.

Vessels recently classed and rated by the American bureau of shipping in the Record of American and Foreign Shipping are as follows: American screw Seminole; American barkentine Stephen G. Hart; American schooners George M. Grant,

Elizabeth Palmer and Elizabeth T. Boyle; American terns Oliver S. Barrett, Luther T. Garretson, Phillips M. Brooks, Carrie A. Bucknam, Georgia D. Jenkins, Nantasket, George H. Ames, Helen Stewart, E. S. Lord, Carrie Strong and Victor; British tern Arena; British schooner Lavonia; British steamship Strathcona, and Swedish schooner John.

It is pointed out, in lieu of the present strike in the ship yards in New York city, that over fifty years ago New York city was a great wooden ship building center. Clippers were built there in large numbers for foreign trade. Ship carpenters had high wages for that period, \$3 per day, but in an evil moment someone suggested that they should be receiving \$3.50. Notwithstanding the fact that they were contented, they went on strike for the higher rate of pay with the result that the ship yards were closed. Orders, of course, went elsewhere and wooden ship building in New York never revived. During the past few months steel ship builders in New York have been greatly harassed by labor, and some of them have suspended operations. In some instances gross injustice has been done to employer and workman alike, for a dissatisfied few have thrown the whole out of employment. Meanwhile, of course, repair work is seeking other towns.

Hunters' Special Rates.—Via Nickel Plate road to points in northern Michigan and Wisconsin. Tickets on sale Sept. 15 to Nov. 15, '03, inclusive. Liberal return limit. See nearest agent for particulars or address E. A. Akers, C. P. & T. A. Cleveland, Ohio. Oct. 23 '173).

Galveston, Texas, Oct. 7, 1903.

Sealed proposals, in duplicate, for grade raising at Galveston, Texas, involving over 11,000,000 cubic yards of filling, will be received by the Chairman of the Grade Raising Board, until 2 P. M., Dec. 7, 1903, and then publicly opened. For information apply to E. R. Cheesborough, Secretary Grade Raising Board, Galveston, Texas.

Dec. 8 C. S. RICHE, Consulting Engineer.

Gasoline Launch for Sale.

Gasoline launch, 7½ by 35 ft., 12 H. P., double cylinder engine; canopy top, new curtains, leather cushions; lights; steunch and speedy, all complete. Cost \$1,800; will sell for \$1,200. Must sell to close estate. Wm. J. St. Aubin, 538 St. Aubin ave., Detroit, Mich. Nov. 5

Patent Rights on Life-Saving Appliance.

For Sale.—In part or as a whole. The patent rights issued and pending on a high grade steel life-saving appliance for use on board ships at sea. Correspondence solicited from gentlemen of large influence in maritime affairs or manufacturers of ship fittings. Price nominal. Appliance is thoroughly standardized on a commercial basis and highly endorsed. Address Box 52, the Marine Review Pub. Co., Wade Bldg., Cleveland. Nov. 5

Dredging Plants for Sale.

For Sale.—Two dredging plants complete, consisting of two dredges, tugs Maytham and Duncan Robertson; also five dump scows and two flats, with sundry duplicate parts of machinery, etc.; also extra spud anchors and dipper teeth, etc.; all having been kept up in good working condition and comparatively new, and could be delivered at once on satisfactory sale. For further information as to capacity and prices of each plant inquire of James Pryor, Houghton, Mich. Nov. 12

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18 Broadway, NEW YORK CITY

For Sale.

Tug Duncan City. Address, Geo. Pankrantz Lumber Co., Sturgeon Bay, Wis. tf

Gasoline Engine for Sale.

For Sale Cheap—One 16-H. P. Superior gasoline engine. Used less than three months. Address Alpern & Co., Alpena, Mich. Nov. 12

\$5,000 Buys Steamer Inter Ocean

Length 214 ft., beam 36 ft. Capacity 1600 tons. Steeple-compound engine. Boiler allowed 110 lbs. steam. Address C. S. Mahoney, 17 Main St., Buffalo, N. Y. tf

Package Freight Steamers for Sale.

For Sale.—Steamers JOHN C. GAULT and RUSSELL SAGE; 1,200 tons capacity; complete fit out for package freight. Inland Lloyds rating, A2. Compound engines and two marine boilers in each boat; in fair condition. For particulars address A. W. Colton, Toledo, O. Oct 29

Tug for Sale.

Tug Warwick—Engine 15x17. Boiler allowed 110 lbs. steam. Both in first-condition. Hull practically new. Boat inspected and ready to run. Cheap for cash. Can be seen at Toledo, O. Apply to James Rooney, 1118 Collingwood ave., Toledo, O. tf

Boiler For Sale.

For sale cheap. Scotch marine boiler 10 ft. by 78 in. triple riveted, ¾ steel plate, dome 6 ft. by 24 in., 98 three inch tubes, stays ¾ center; allowed 168 lbs steam pressure. Boiler is now working and is as good as new. Address I. Applebaum, Detroit, Mich. tf

Small Steam Barge for Sale.

I have for sale a small steam barge. Carries 250 tons. Address, Capt F. E. Wood, Alexandria Bay, N. Y. tf



Steamer and Tow Barge for Sale.

Lake steamer and tow for sale. Total tonnage 1,000. Equipment complete A-1 condition. Address, G. M., care, Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, O. Nov. 12

Two Steamers Wanted.

Cash will be paid for two steamers for Pacific trade if found suitable as to dimensions, etc. Wooden boats will not do. They must be of iron or steel. The first vessel should be of 180 to 210 ft. length, 30 to 33 ft. beam, with 11 to 13 ft. draught aft when loaded with full dead-weight cargo. Speed from 8 to 10 knots per hour. Accommodations for about twelve first-class passengers. Capacity to be of 600 to 900 tons dead-weight. Length of the second vessel should be 135 to 150 ft.; beam 24 to 30 ft.; draught aft loaded with full dead-weight cargo, 8 to 9 ft.; capacity 300 to 500 tons dead-weight cargo; speed from 8 to 10 knots per hour, with accommodations for about ten first-class passengers. Address Box 51, The Marine Review Pub. Co., Wade Building, Cleveland, O. tf

Tug for Sale.

Length 75 ft., breadth 13.9 ft., depth 7.6 ft. Enquire H. Heinecke, Sheboygan, Wis. Oct. 29

Wanted Situation as Oiler.

Position wanted as oiler on lake vessel by party who is willing to work and anxious to get engineer's papers. Has had eight years' experience as stationary engineer. At present superintendent of a large steam plant. Can produce best of recommendations. Address Box 50, Marine Review Pub. Co., Cleveland. tf

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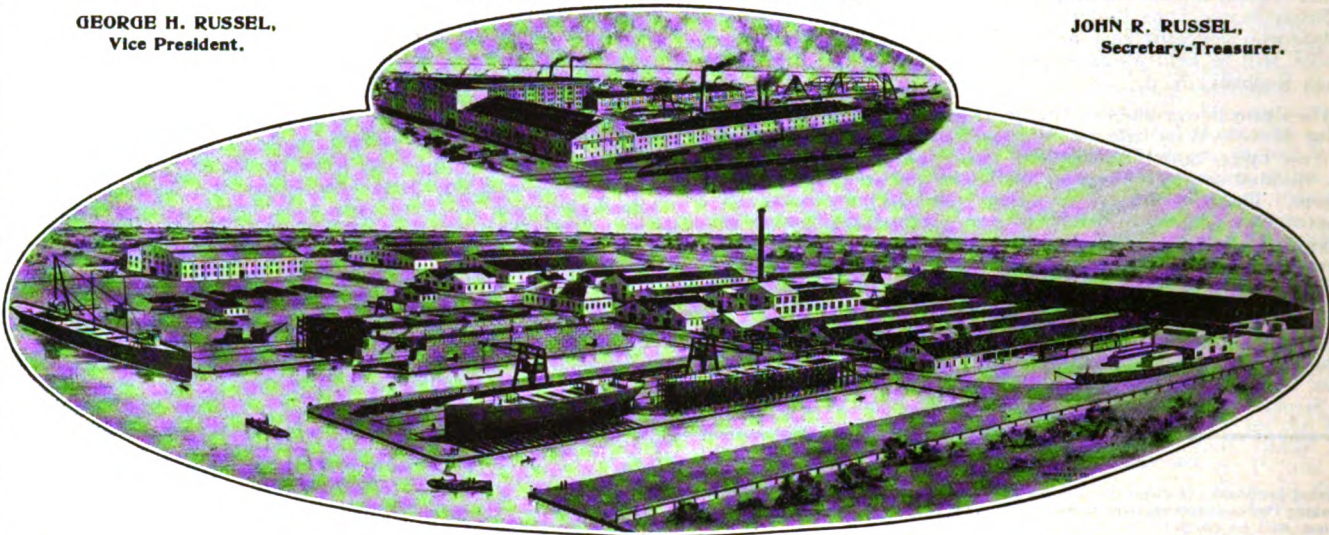
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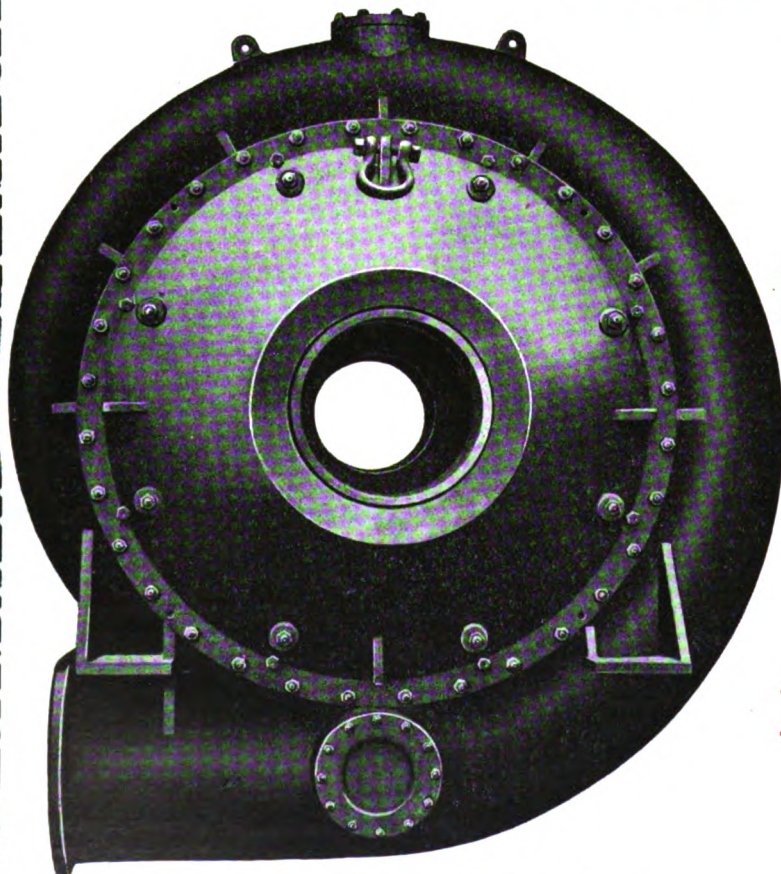
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VOL. XXVIII.

CLEVELAND, O., OCT. 22, 1903.

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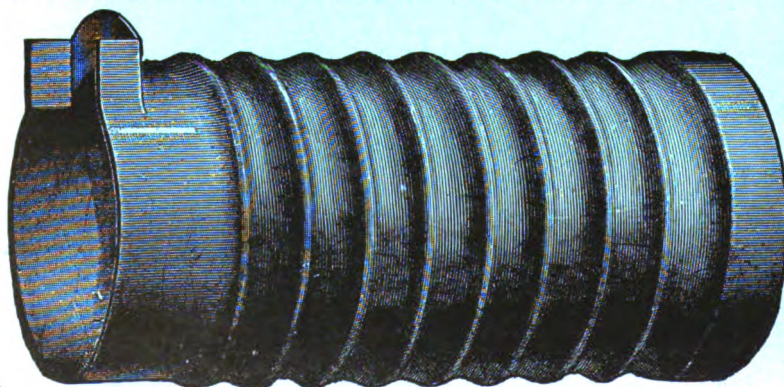
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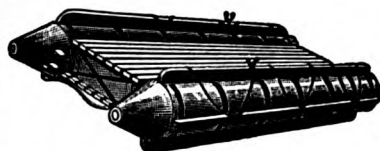
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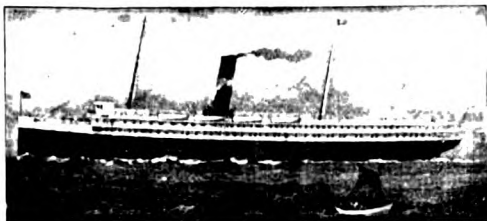
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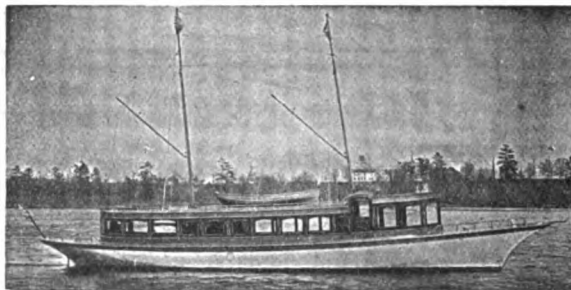
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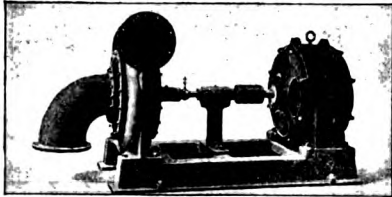
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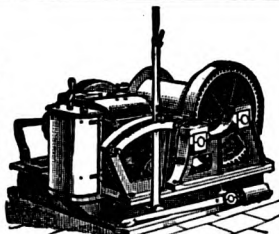
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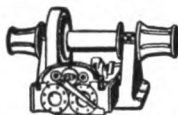
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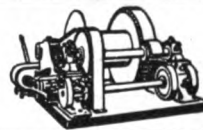
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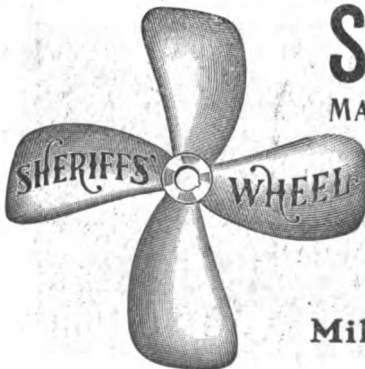
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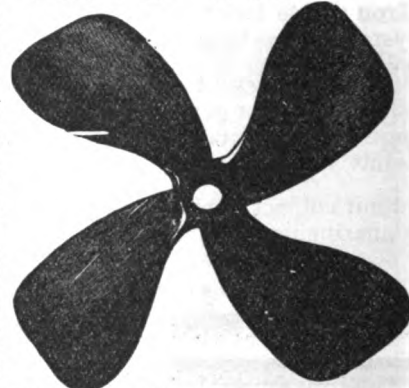
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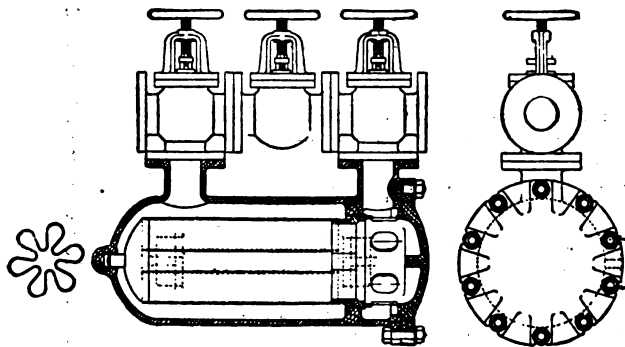
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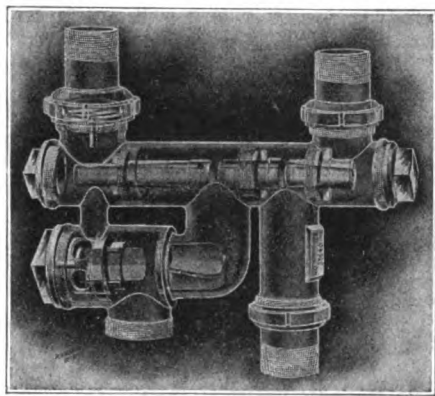
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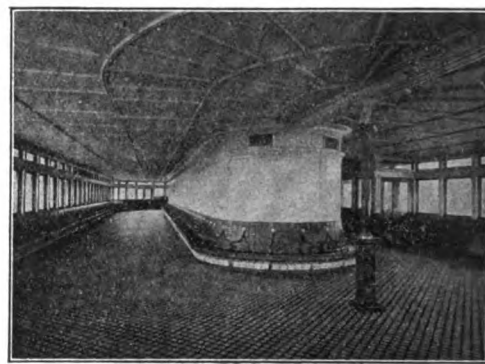
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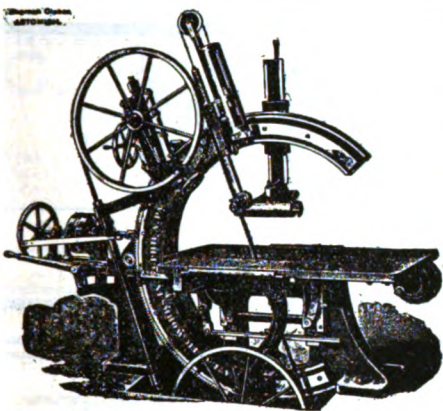
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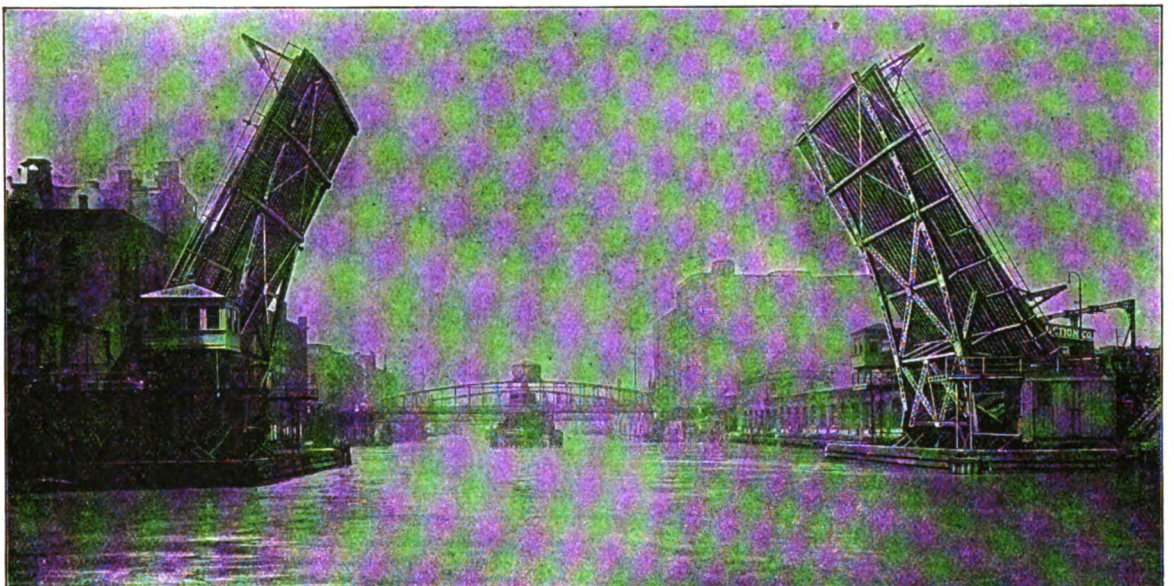
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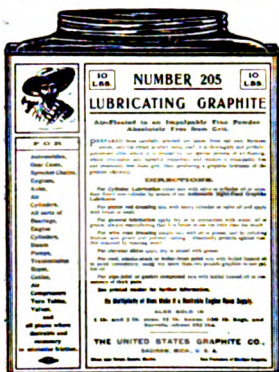
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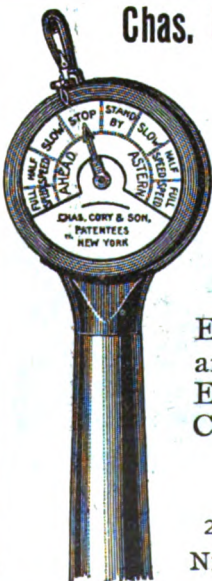
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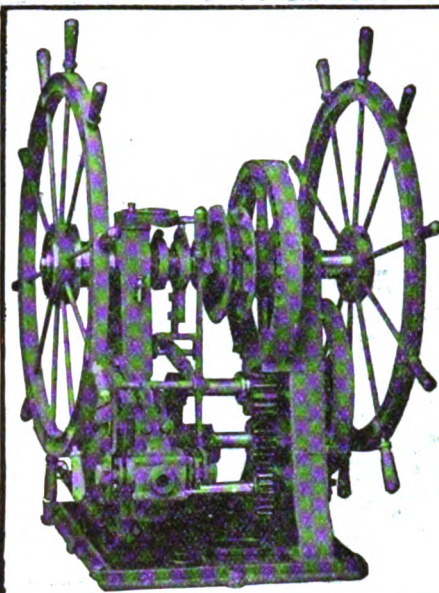


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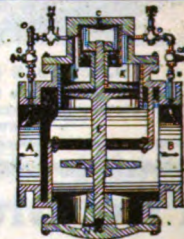
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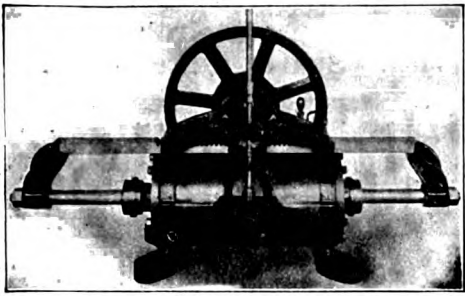
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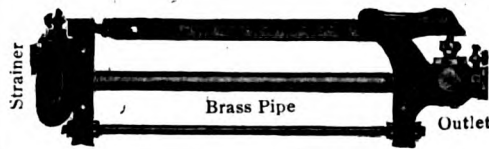
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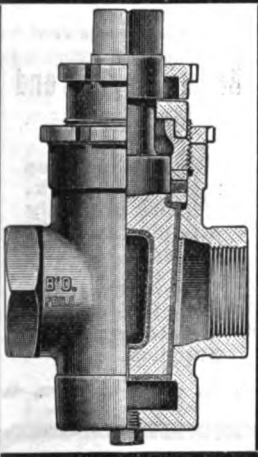
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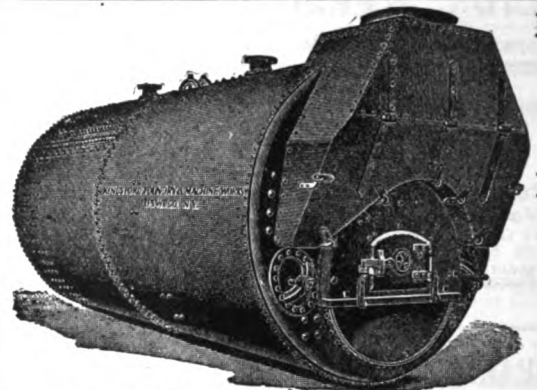
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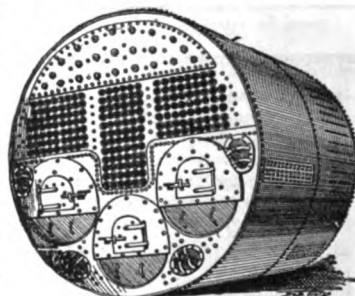
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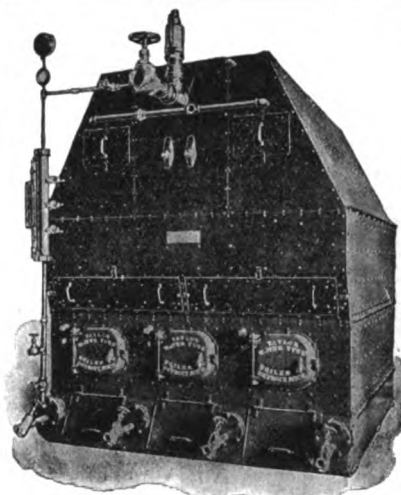
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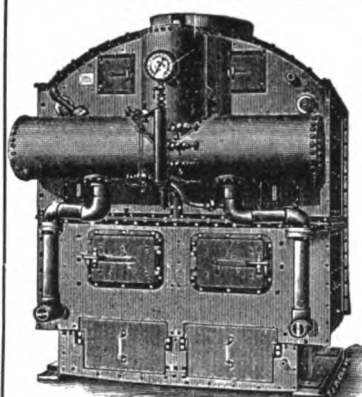
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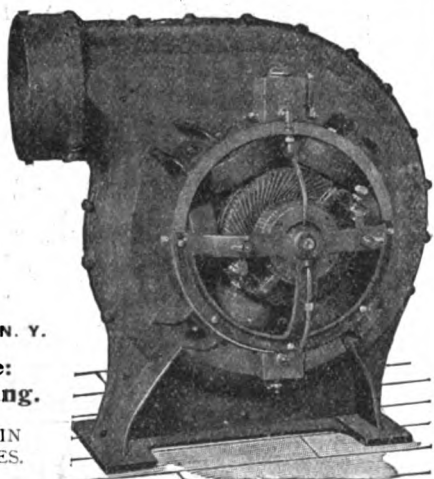
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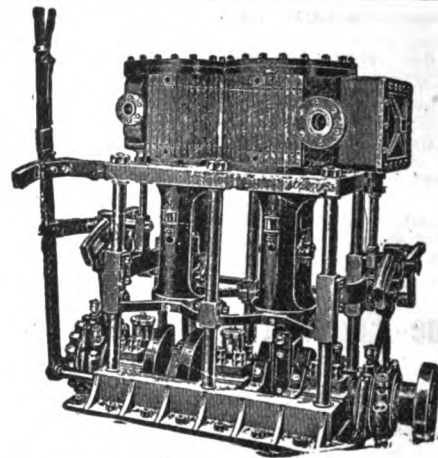
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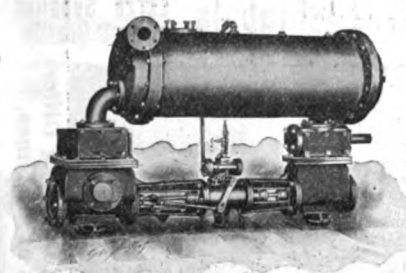
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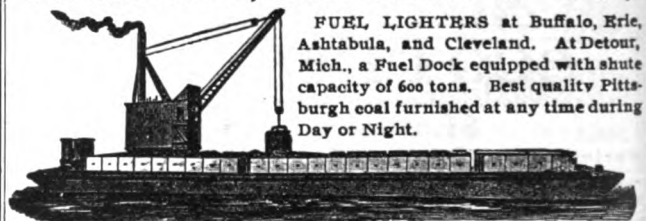
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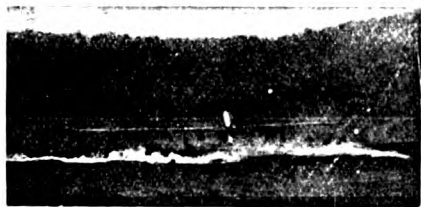
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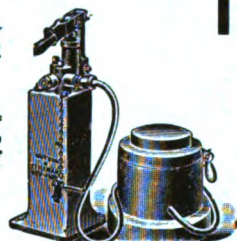
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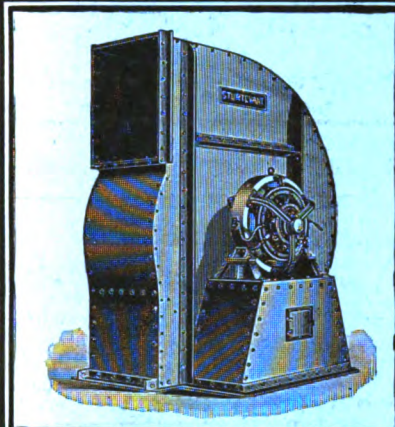
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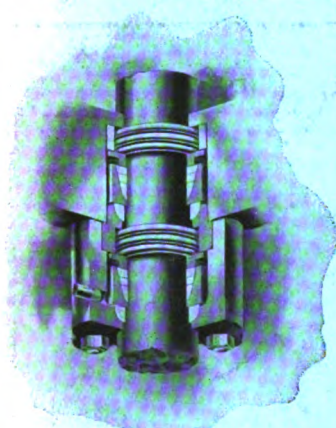
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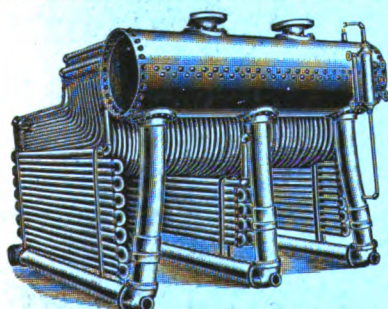
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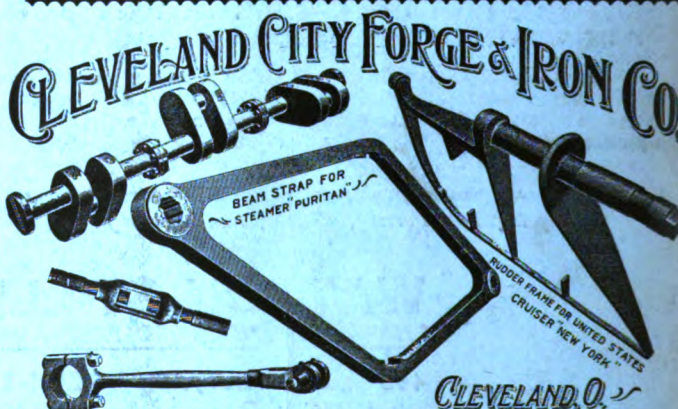
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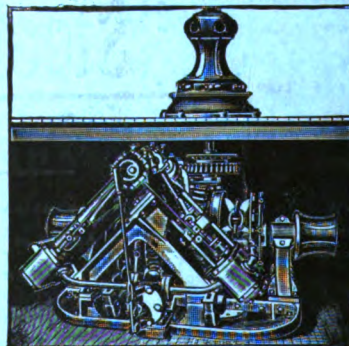
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